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# Pinery Provincial Park

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## Revised Master Plan Draft



Ministry of  
Natural  
Resources

Ontario



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Your file:

Our file:

Dear Sir/Madam:

Please find enclosed a draft copy of the Revised Master Plan for Pinery Provincial Park. This plan contains numerous recommendations which will guide the future management of the park's resources and the re-development of some of the park's facilities. The recommendations were made following a careful review of information which was available on the public use of facilities and the physical, cultural and ecological features of the park.

We are anxious to receive your response to the recommendations outlined in the draft of the Revised Master Plan. Please complete the accompanying comment sheet and/or write a letter and send it to the following address before September 9, 1977:

District Manager  
Ministry of Natural Resources  
P.O. Box 1168  
Chatham, Ontario  
N7M 5L8

If you prefer, you may contact Ministry personnel by telephone at either the District Office, Chatham (519-354-7340) or at Pinery Provincial Park (519-243-2220). After reviewing all of the comments received from the public, a final Revised Master Plan for Pinery Provincial Park will be prepared and made available for general information.

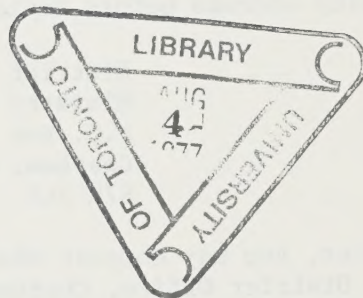
We encourage you to take this opportunity to participate in the future development and management of Pinery Provincial Park. Your contribution to the planning of this park will enhance the quality of the activities and features which will be provided. Thank you for your interest.

Yours very truly,

A handwritten signature in cursive script, reading "D.R. Fortner".

D.R. Fortner  
District Manager  
Chatham

Encl.



Comment Sheet

If you have any comments on the park's goal and objectives, classification, management strategies, development program or any other aspect of the revised master plan for Pinery Provincial Park, please detach this and make use of the space provided below. Mail your comments before September 9, 1977 to:

District Manager  
Ministry of Natural Resources  
P.O. Box 1168  
Chatham, Ontario  
N7M 5L8

Name \_\_\_\_\_ Organization \_\_\_\_\_  
(Please Print)

Address \_\_\_\_\_



Pinery Provincial Park

Revised Master Plan  
Draft

June, 1977





## Contents

### Figures/Tables

### Metric Measures

Master Plan Highlights	1
Introduction	2
Purpose of a Master Plan	4
Park Area	5
Regional Context	5
Legal Status	5
Park Development	6
Resource Management	9
Regional Market Analysis	11
Regional Population	11
Park Visitors	11
Local Recreational Opportunities	15
Demand for Recreational Opportunities	18
Biophysical Resources	24
Climate	24
Geology and Geomorphology	24
Topography	27
Soils	31
Hydrology	32
Flora and Vegetation	32
Fauna	38
Cultural Resources	40
Prehistory in the Pinery Area	40
Prehistory in the Pinery Provincial Park	40
Early Explorers	41
Early Settlement	41
Recent History	42
Natural and Cultural Features Evaluation	43
Park Policy	47
Park Goal	47
Park Objectives	47
Park Classification	47

Park Zoning	48
Access Zone	48
Development Zone	48
Historical Zone	50
Nature Reserve Zone	50
Natural Environment Zone	51
Visitor Services	52
Communications	52
Interpretation	53
Outdoor Education	53
Recreation	53
Development Program	55
Visitor Centre and Amphitheatre	55
Administration Office and Maintenance Complex	55
Day-use area	57
Winter Activities Site	57
Shower Facilities	58
Internal Roadway System	58
Implementation Phasing	59
Park Services	62
Park Operations	62
Staffing	63
Service Facilities	64
Management Policy	66
River	66
Off-road vehicles	66
Campgrounds	66
Landforms	67
Vegetation	67
Fire Protection	67
Wildlife	67
Archaeological Sites	68
Underground Services	68
Management and Research Plans	69
Park Management and Operating Plan	69
Future Studies and Research Plan	70
References	71

## Figures

1	Regional Context	7
2	Existing Facilities	8
3	Travel Time Zones	13
4	Moraines and Tills of Southwestern Ontario	28
5	Geology and Geomorphology of Pinery Area	29
6	Topography	30
7	Vegetation	35
8	Natural and Cultural Features Evaluation	46
9	Zoning	49
10	Master Plan (Proposed Changes)	56

## Tables

1	Population Statistics and Projections in the Market Area (Ontario only)	12
2	Day-user and Camper Statistics for Pinery Provincial Park	14
3	Use of Winter Facilities	16
4	Availability of Recreational Opportunities at Pinery and the Local Area	17
5	Summer Recreational Opportunities Demand	19
6	Winter Recreational Opportunities Demand	19
7	Existing Recreational Opportunities in Local Park Area	21

Tables (cont'd)

8	Future Recreational Opportunities Demand in Pinery Area	22
9	Monthly Climatic Information	25

Metric Measures

<u>Unit</u>	<u>Equivalent</u>
centimetre (cm)	0.3937 inches
metre (m)	3.2808 feet
kilometre (km)	0.6214 miles
square kilometre (sq km)	0.3861 square miles; 100 ha
hectare (ha)	2.4710 acres
cubic metre (cu m)	35.3148 cubic feet
litre (l)	0.2200 gallons
kilogram (kg)	2.2046 pounds
kilowatt (kw)	1.3410 horsepower
degrees celsius ( <sup>o</sup> C)	$\text{° C} \times \frac{9}{5} + 32 =$ degrees Fahrenheit ( <sup>o</sup> F)



## Master Plan Highlights

The provision of a variety of year-round recreational opportunities appropriate to the classification of Pinery as a natural environment park.

Designation of management zones within the park, including the nature reserve category, to set aside relatively large undisturbed areas which are illustrative of the chronological, geomorphic and vegetative evolution of the park landscape.

Construction of a visitor centre accessible to all park visitors on a year-round basis.

Improvements to the amphitheatre for evening visitor services programs.

Construction of concession facilities in the day-use area.

Development of a few picnic sites along the Ausable River.

Improvement of the picnic facilities in the day-use area adjacent to the Lake Huron shoreline.

Construction of dune-crossing structures to minimize the impact of pedestrian traffic.

Addition of shower facilities to park campgrounds.

Maintenance of the maximum operating level of 1,000 campsites, with the remaining 267 campsites to be closed on a yearly rotating basis for rehabilitation and no additional campsites to be developed.

Re-development of the park administrative offices and maintenance complex.

Recommendations to undertake additional planning programs in the areas of park management, park operations and future studies and research.

## Introduction

Pinery was established as a provincial park on October 11, 1957. In the ensuing years, the park evolved without the benefit of an officially recognized master plan. A growing appreciation of the significant resource features of the park, coupled with an increasing demand for additional and often diverse recreational facilities, highlighted the need for a detailed plan to ensure the orderly development and management of the park.

In 1967, the Ministry of Natural Resources (formerly the Department of Lands and Forests) initiated a program to provide master plans for all the provincial parks in Ontario. A master plan for Pinery was released for public scrutiny in 1971. Some of the recommendations of that plan were not favourably received by the public, while others gained widespread support. As a direct consequence of public reaction, it was decided that the plan should be revised. Thus, public involvement performed an important function in identifying specific policy recommendations and issues about which there was obviously strong sentiment.

Since the release of the master plan in 1971, Ministry staff have focussed their efforts on researching and reviewing specific topics in order to strengthen the foundations of future planning. In 1972, the Ministry undertook a preliminary survey of archaeological sites within the boundaries of the park. The following year, a consulting firm was commissioned to prepare a report on the feasibility of a winter activities program in the park. This report made specific recommendations on the types of activities and facilities appropriate to Pinery, based on the market area served, resource constraints, development potentials and development alternatives.

In addition to these two specific reports, information from other sources has become available and is used in this revised Pinery master plan. The Tourism and Outdoor Recreation Planning Study (T.O.R.P.S.) has made information available on Ontario residents' participation in and preference for specific recreational activities. It has also provided a comprehensive and updated inventory of alternative recreational opportunities in southwestern Ontario.

The Ministry of Natural Resources, Division of Mines, has recently released geological maps and accompanying descriptive notes on the Grand Bend area and immediate vicinity. The field work and mapping for these publications was carried out in the summer of 1974.

The Ministry of Natural Resources, Division of Parks, has been actively discussing a proposed Provincial Parks Policy for Ontario. While not yet officially approved, this draft policy has provided a much needed philosophical basis for the establishment of provincial parks and clarification of the role that each class of park will play within the total system.

Great strides taken over the past five years can only enhance our understanding and appreciation of the complex set of factors which make up Pinery Provincial Park. The proposed policy framework for the Provincial Parks System, the additional resource information, T.O.R.P.S. data and the winter activities feasibility study are tangible evidence of the efforts of the Ministry of Natural Resources to ensure that future planning, development and management are consistent with resource values and visitor expectations.

## Purpose of a Master Plan

The primary purpose of the Pinery Provincial Park Revised Master Plan 1977 is to establish a policy framework and detailed guidelines for all future planning, development and management decisions within the park. The specific intentions of the master plan are as follows:

- To define the role of Pinery within the Ontario Provincial Parks System.
- To examine the availability of alternative recreational opportunities provided by other provincial parks and commercial, private or public recreational facilities in the region.
- To analyze the ecological, cultural and physical features within the park, to identify their values and to determine their use limitations.
- To formulate the goal and objectives for the park according to the classification within the Provincial Parks System.
- To designate zones indicating the nature and extent of facilities and recreational opportunities appropriate to the assigned classification.
- To outline resource management policies and programs.
- To elaborate on a visitor services program which will enable park visitors to enjoy and appreciate the resources and facilities of Pinery.
- To identify development priorities and operational and staffing programs.

Following public review of this document, the master plan, as approved by the Minister of Natural Resources, will direct all future development and management of Pinery Provincial Park. As an established Ministry policy, the master plan will be reviewed every five years commencing with the approval of this plan and will be completed as funds and priorities permit.



## Park Area

### Regional Context

Pinery is located on the southeastern shore of Lake Huron in an area of southwestern Ontario which is noted for its spectacular sand dune formations. The entire 2,317 ha of the park and its 8 km of shoreline are located within the Township of Bosanquet in the County of Lambton (Figure 1).

The southeastern boundary of Pinery lies adjacent to Highway 21, the Bluewater Highway. This highway runs parallel to the Lake Huron shoreline from the Village of Ravenswood north to the Town of Southampton in Bruce County, providing good access for travellers from the northern counties of Huron, Bruce and Grey. Travellers originating from eastern counties and regional municipalities usually connect with Highway 21 via Highway 7 and Highway 82. County Road 7 from Sarnia provides the most direct route for visitors from the western sections of Lambton County, Port Huron and the eastern areas of Michigan state. Both Highway 21 and Highway 79 give direct access routes to travellers originating from the southern area of Lambton County and Kent County.

The closest urban centres to Pinery are Sarnia (64 km), London (88 km) and Chatham (120 km). Travel time from the London area will be reduced after the Highway 402 extension from Sarnia to London is completed within the next five years. Other travel time and traffic flow patterns to Pinery are not expected to change since no additional major highway construction projects are planned for the near future.

Lambton County is a rich, cash-crop area, and agriculture is an important element in the local economy. Approximately 85 percent of the total county land area is occupied farmland. Forested areas are slightly less than seven percent of the county's land area.

Recreational facilities in the "Bluewater County" are used extensively by residents of both Ontario and the United States. Facilities are concentrated along the corridor from Port Lambton to Grand Bend. The latter community, just 9.6 km north of Pinery is a well-known Lake Huron tourist resort providing activities for both winter and summer visitors.

### Legal Status

The park was formally established on October 11, 1957 by Ontario Regulation 299/57. After additional land purchases in the following decade, the total area now extends over 2,317 ha. The park includes Lots 9-11, 13-31 and parts of Lots 32, 33 and 34 Lake Road West Concession and parts of Lots 9-31 Lake Road East Concession. On the southeastern side of Highway 21, parts of Lots 8, 9 and 10 (known as Severn Park) and parts of Lots 21 and 22 Lake Road East Concession

are included in the description of the park boundaries. A 183-m wide stretch extending out from the water's edge of Lake Huron and along the entire park shoreline is included in the boundary description. In 1972, all of Lot 20 and part of Lot 19 Lake Road East Concession were acquired by the Ministry of Natural Resources. This 40.5 ha area of public land adjacent to the northeast boundary of the park is not in regulation under The Provincial Parks Act. Four areas within the park boundary, totalling 172 ha have been set aside as wilderness areas under Regulation 828 of The Wilderness Areas Act.

#### Park Development

The major existing facilities in the park are shown in Figure 2.

Access is controlled at the entrance booth located a short distance off Highway 21. This is the only entrance for visitors wishing to use park facilities. There is a total of approximately 100 km of primary internal roads. Only 10 km are cleared of snow during the winter months.

Three distinct campgrounds, each with a permit sales office, have been developed. Dunes Campground (383 sites), Burley Campground (390 sites) and Riverside Campground (494 sites) have a combined total of 1,267 campsites. Riverside Campground has 130 sites with electrical hookups which remain open on a year-round basis. Group camping is available for 13 individual groups at four designated locations. One group campground remains open for winter use.

Day-use facilities are located in the northeast section of the park. Parking for approximately 1,100 cars is provided for in nine separate parking lots. Boat-launching facilities are located at both Burley Campground and Dunes Campground. Similar facilities are located in the day-use area. In addition, canoe-launching facilities are available close to the concession bridge for boat access to the Ausable River.

A permanent visitor centre does not exist at the present time. Temporary facilities are located in the winter activities area. An amphitheatre, with a seating capacity of 500 people, has been established a short distance west of the park concession. The park administration offices and maintenance complex are centrally located. The former provides offices for park administrative staff and a detachment office for the Ontario Provincial Police.

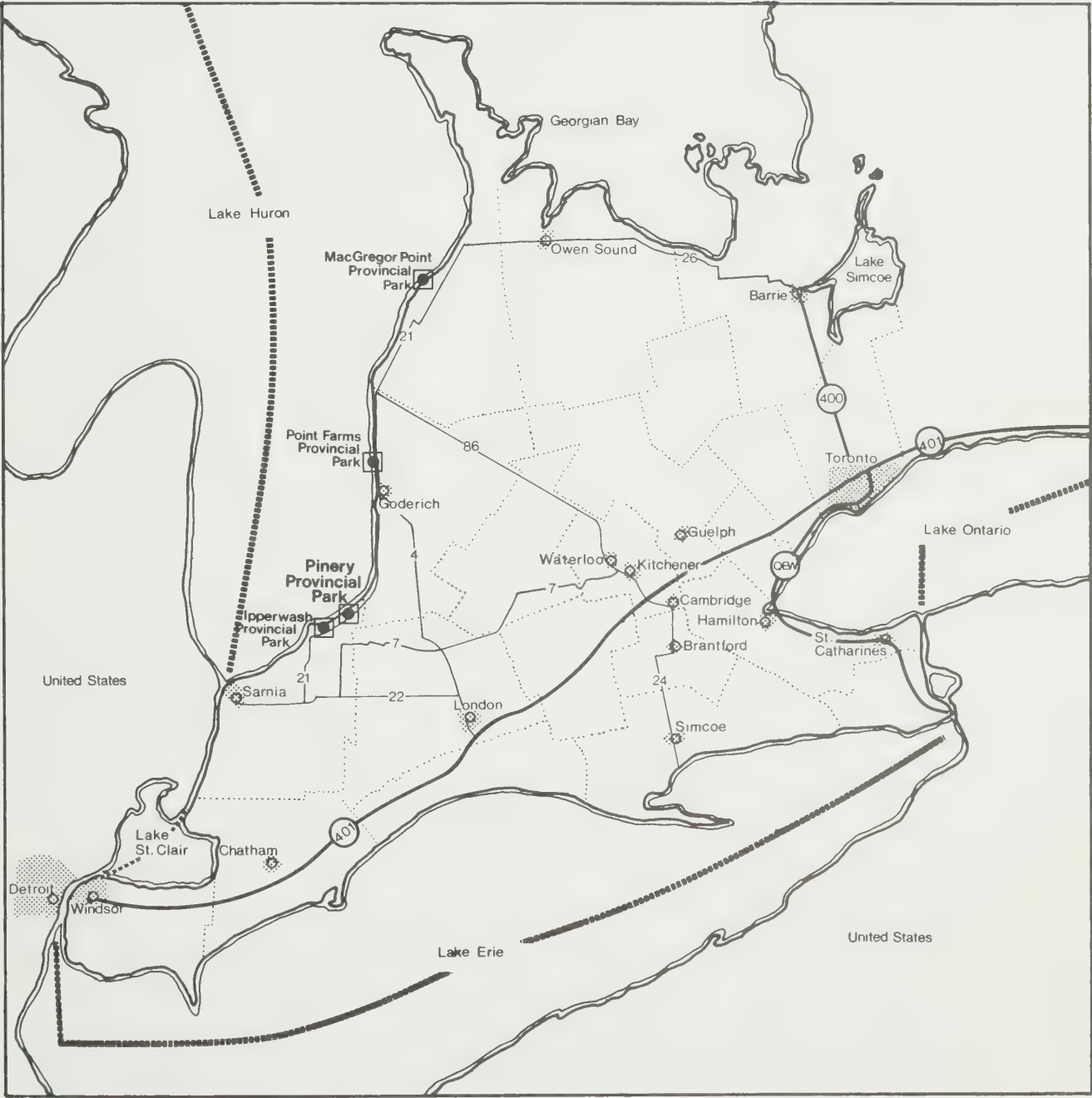
The winter activities area is accessible to winter visitors just off the main entrance road. Facilities include a toboggan run, ski hill, skating rink and chalet/concession. Trails for cross-country skiing and snowmobiling are provided.

Trail facilities are accessible to all park visitors. Eight hiking trails provide a total of 16 km of trails for guided and self-guided hikes. During the winter months, 22.5 km of snowmobile trails and 22 km of cross-country skiing trails are maintained for visitors.

Figure 1

Regional Context

- Provincial park
- International boundary



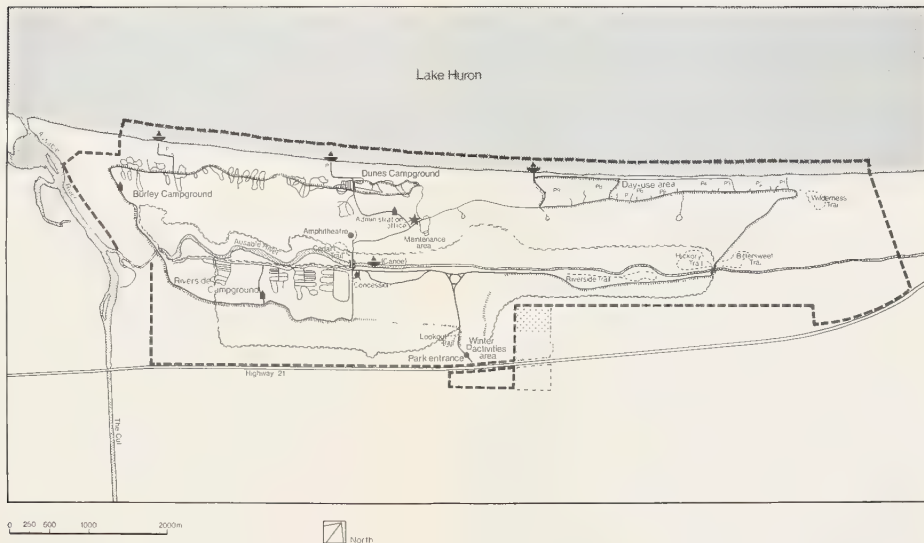
0 10 25 50 100 km







## Existing Facilities





## Resource Management

### Forest Management

Between 1957 and 1970, approximately 1.5 million red pine and white pine trees were planted in the park area. This program was undertaken to rehabilitate areas previously damaged by fire or lumbering. The harvesting of commercially marketable timber is no longer practised in the park. Only trees which constitute a safety hazard to visitors are removed.

### Forest Protection

A forest fire contingency plan outlining the procedures to be followed at Pinery has been prepared. Internal fire roads and equipment are regularly maintained, and staff are trained in evacuation procedures and fire-fighting methods. In addition, the fire tower is regularly manned during the dangerous fire season.

### Wildlife Management

Beaver dams on the northern section of the Ausable River have, on occasion, caused flooding problems outside the park. In the past, obstructions at the north bridge culvert have been removed and the beavers relocated to an alternative site. Feral cats and dogs which roam within the park and disturb wildlife are removed or destroyed.

### Fisheries Management

Each year, the Ministry of Natural Resources, Division of Fish and Wildlife, stocks the section of the Ausable River from the concession bridge northward with rainbow trout and speckled trout. This program provides increased opportunities for recreational fishing.

### Land Management

A program to rehabilitate and stabilize some dune areas susceptible to erosion has been implemented in recent years. Areas selected are those affected by heavy use, road cuts and adjacent to high-valued structures. No protective measures have been taken along the primary dune which has been subject to erosion from storm waves and high lake levels.

A pilot project has been implemented to monitor the effects of rehabilitation techniques in the day-use beach area. The location chosen has experienced heavy use, loss of vegetation and wind erosion.

Roadside scars have been leveled and dressed with topsoil. Rye grass has been planted to restrict further erosion until native plants and grasses have an opportunity to regenerate.

#### Grassed Area Management

Grassed areas in the park are mowed according to a cutting plan. In general, this specifies a maximum mowing width of 0.8 m along main roads and in areas adjacent to major facilities, such as comfort stations, office buildings, bridges, concessions, road intersections, etc.

#### River Management

The section of the Ausable River which runs through Pinery Provincial Park is blocked at Grand Bend. Flow in the river, although sluggish, is maintained by springs and storm run-off. A dam at the concession bridge keeps water levels about 1-2 m above normal. Below the dam, the level of the river fluctuates with changes in the level of Lake Huron.

Water from the northern section of the river is pumped to the winter activities area during the winter season and is used for making artificial snow for the downhill ski slope.

#### Campground Management

The campgrounds are the most extensively used areas of the park and require the greatest management effort. An evaluation of all campsites is carried out each year and the sites which have deteriorated from over-use are closed for part or all of the season for rehabilitation. A maximum operating level of 1,000 campsites is maintained when feasible. Campsite boundaries are marked, and all camping equipment is restricted to this area. Buffer zones between campsites are protected.

Parking spurs for vehicles are marked in some areas. The one car per campsite regulation is strictly enforced, and a limited number of parking spaces are provided in each campground for second cars or visitors.

Dead trees, standing within twice the length of the tree from the campsite boundary, are removed for safety purposes.

Fireplace grills are located in permanent positions to discourage indiscriminate building of fires.



## Regional Market Analysis

The need for outdoor recreational facilities will undoubtedly grow in the coming years. This growth will likely be more visible in southwestern Ontario because of changes in population patterns and densities. The demand for facilities will reflect a need for variation and diversity which can be met, in part, by the interaction of the public, private and commercial sectors. In the near future, the Tourism and Outdoor Recreation Planning Study (T.O.R.P.S.) will begin to provide a mechanism for a more complete understanding of the complex relationships between the supply and demand factors for recreation facilities. Meanwhile, a less than perfect description of the Pinery market area will have to suffice.

The market area served by the facilities of the park has been defined in terms of travel time zones. Past studies have indicated that a large proportion of visitors to a park reside within a specific travel time zone. Day-users seldom travel more than one hour to visit a park, while the majority of campers generally reside within a three-hour drive. The one-hour and three-hour travel time zones for Pinery are shown in Figure 3.

### Regional Population

Population in the region over the past ten years has shown a steady increase (Table 1). Between 1965 and 1974, the Ontario population within a one-hour drive of Pinery grew by approximately 22 percent. During the same period, but in an area one to three hours from the park, a growth of 28 percent was recorded. Growth rates over the next 20 years are expected to decrease slightly. It is estimated, however, that over three million people will live within a three-hour drive of the park by the year 1986. A further increase of close to 500,000 is expected by the year 1996.

Michigan residents form a significant proportion of visitors to parks in southwestern Ontario. There are close to one million Michigan residents within an hour's drive of the Sarnia/Port Huron border crossing. An additional 4.5 million live within a three-hour drive of the park. Altogether, an estimated eight million people live within a distance of three hours or less from Pinery.

### Park Visitors

Visitor statistics since 1965 are given in Table 2. Figures for both campers and day-users during the summer and winter seasons are shown. Summer use of facilities by campers has remained relatively constant over the past six years. Yearly fluctuations occur as a result of a number of factors. Inclement weather, for example, may decrease the use of facilities, particularly during weekends. Winter camping has declined significantly in the same time period. No explanation for this decrease can presently be given.

Table 1: Population Statistics and Projections in the Market Area (Ontario Only)

<u>Travel time zones</u>	<u>1965</u>	<u>1971</u>	<u>1974</u>	<u>1986</u>	<u>1996</u>
One-hour drive	340,000	391,000	415,000	465,000	507,000
One-hour to three-hour drive	1,770,000	2,081,000	2,265,000	2,700,000	3,100,000
Total within three-hour drive	2,110,000	2,472,000	2,680,000	3,165,000	3,607,000

Figure3

Travel Time Zones

- Isochrone
- International boundary

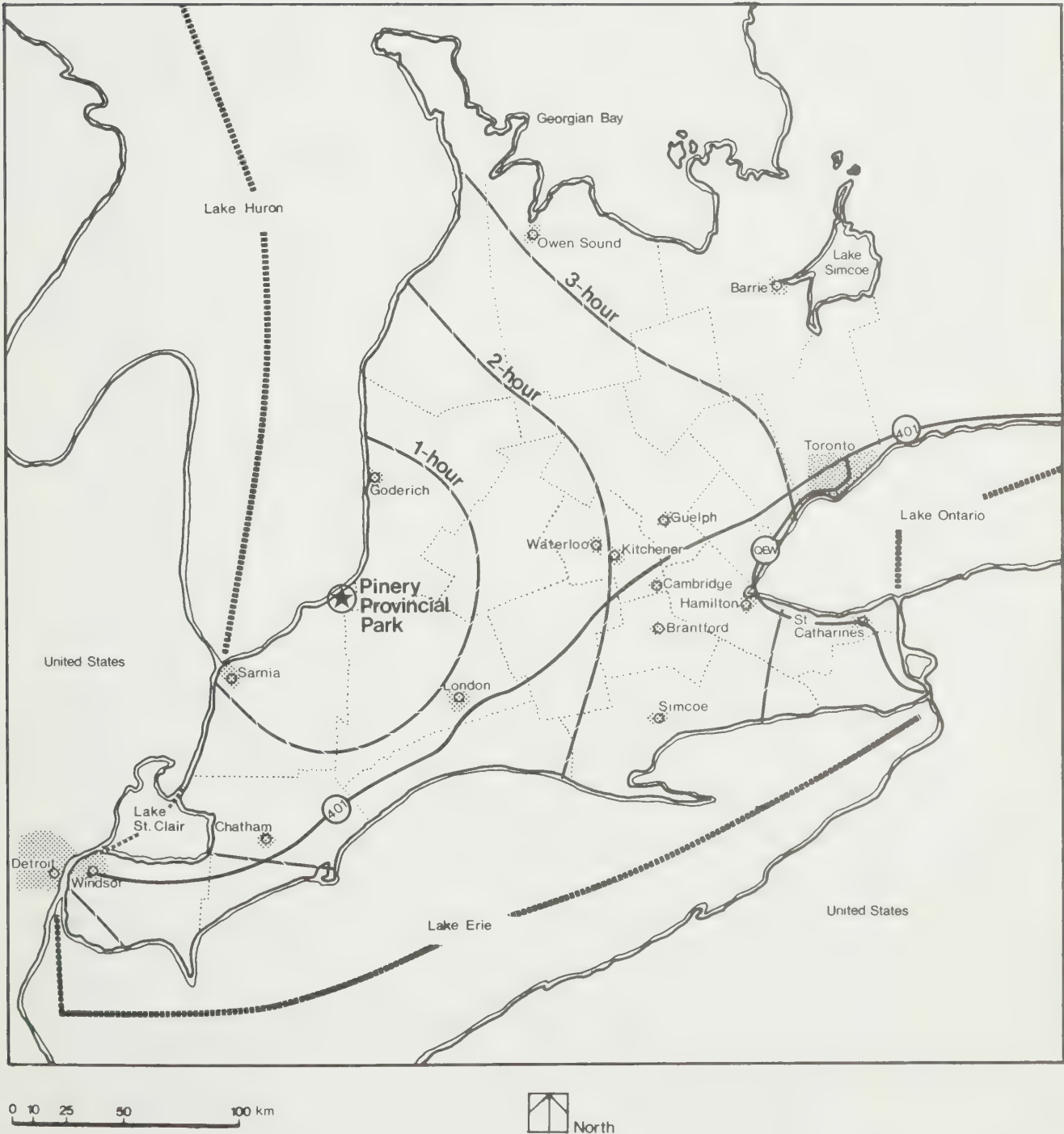




Table 2: Day-user and Camper Statistics for Pinery Provincial Park

<u>Year</u>	<u>Summer Use</u>		<u>Winter Use</u>	
	<u>Campers</u>	<u>Day-users</u>	<u>Campers</u>	<u>Day-users</u>
1965	57,375	98,420	5,918	3,143
1966	58,656	119,868	6,447	3,500
1967	62,982	115,020	5,421	3,122
1968	173,621	104,065	5,432	6,370
1969	86,719	118,720	10,734	14,982
1970	106,466	159,175	9,229	15,015
1971	101,383	155,771	7,675	7,976
1972	108,923	117,664	773	5,323
1973	103,466	121,779	959	5,344
1974	104,566	150,335	903	4,739
1975	103,617	68,029	920	5,446

Source: Statistics are based on permit sales records.



Day-use figures show greater variations over the years. Summer use dropped by approximately 55 percent in 1975 from the preceding year. Reduced beach areas resulting from high lake levels in 1972 appear to have influenced the use of these facilities. Winter day-use is strongly related to local climatic conditions. Warm temperatures and poor snow conditions can all but eliminate the use of the downhill skiing facilities, skating rink, snowmobile and cross-country ski trails. Estimates of the use of winter facilities are given in Table 3.

The largest number of day-users and campers visiting the park originate from within the one-hour and three-hour travel time zones respectively. Analysis of data gathered in 1974 indicates that 28.4 percent of summer day-users travel from Michigan, while 46 percent come from Lambton, Middlesex, Huron, and Perth counties. Nearly 90 percent of summer campers come from Middlesex, Essex, Kent, Lambton, Elgin, Perth, Oxford and Huron counties and the bordering areas of Michigan. The latter group accounts for approximately 28.2 percent of all campers.

Group camping facilities are used extensively by institutional organizations during the summer months. Approximately five percent of all camper-days may be attributed to this group.

Educational and scientific groups are primarily day-users originating from all areas of Southern Ontario. Recorded visits to the park by school groups and students have more than doubled in the last five years. In excess of 3,200 contracts were made with educational groups during 1974-75.

#### Local Recreational Opportunities.

Facilities within a one-hour drive of the park have been surveyed by T.O.R.P.S. (1975). These facilities are considered as alternative opportunities for day-users and campers within the Pinery market area. In this area, the general public has access to 47 campgrounds which provide a total of 6,375 campsites. Assuming an average party size of between three and four people and a summer camping season of 135 days, there are existing facilities to offer a potential supply in excess of three million camping opportunities. If the peaks in recreational use (i.e. weekends, statutory holidays, etc.) are taken into consideration, the accessible supply of three million opportunities is reduced to 1.8 million actual opportunities (Table 4).

Access to alternative beach facilities is provided at 44 locations within an hour's drive of Pinery. These facilities offer a combined total of about 20 km of beach open to the public. Opportunities are available for approximately 2.9 million user-days of beach-related activities.

There are some 3,800 picnic sites located in 108 picnic grounds in the one-hour travel zone around Pinery. These facilities provide 1.8 million user-days of picnicking opportunities.

Table 3: Use of Winter Facilities

<u>Year</u>	<u>Downhill skiers</u>	<u>Snowmobilers</u>	<u>Tobogganers</u>	<u>Skaters</u>
1965	1,791		944	703
1966	1,842		2,204	1,508
1967	1,549		2,647	1,602
1968	1,552	821	1,687	811
1969	3,067	258	3,459	3,159
1970	2,637	3,819	2,214	1,552
1971	2,193	917	3,021	2,106
1972	221	776	359	400
1973	946	464	1,600	1,820
1974	775	70	448	620
1975	736	241	432	854

Source: Estimates are based on permit sales and sample counts.

Table 4: Availability of Recreational Opportunities at Pinery and the Local Area

Facility	Pinery	Local area	Space standard	Season length (days)	Institutional constraint factor	Turnover rate	Opportunities in local area (user days)*	Opportunities at Pinery (user days)*
Campsite	1,000 campsites	6,375 campsites	3.5 persons/site	135	0.6	1.0	1,807,317	283,500
Beach	8,879 m	19,872 m	2.8 persons/m	65	0.4	2.0	2,893,363	1,292,782
Picnicking	3,000 sites	3,815 sites	3.5 persons/site	135	0.5	2.0	1,802,587	1,417,500
Snowmobile trails	22.5	122 km	5 machines/km	75	0.5	2.5	57,187	10,546
Cross-country ski trails	21.7	40.5 km	7 skiers/km	75	0.5	2.0	21,262	11,392

\*Opportunities available = (number of facilities) X (space standard) X (season length) X (institutional constraint) X (turnover rate).

During the winter, alternative facilities for outdoor recreation activities are restricted in the vicinity of Pinery mainly because of unfavourable climatic conditions.

Snowmobile trails are frequently operated by private clubs and require a membership for the use of facilities. Within an hour's drive of Pinery, there are an estimated 122 km of snowmobile trails of which 76 km are operated by private clubs (Table 4). Cross-country skiing facilities presently total 40 km. Approximately 14.5 km of trails are operated by institutions or private clubs which require membership before facilities can be used by members of the public. Pinery offers the only downhill skiing facility within a one-hour drive from the park.

#### Demand for Recreational Opportunities

The analysis of present recreational use and the ability to predict future trends are extremely complex tasks. There are many factors to consider when seeking an understanding of the motivations and preferences of people using outdoor recreational facilities. The T.O.R.P.S. "Ontario Recreation Survey" (O.R.S., 1974) was the first step taken to gather specific information on the leisure and recreation patterns of Ontario residents. The results of this survey are used to predict the future recreational demands in the Pinery market area.

The O.R.S. study indicates that 13 percent of southwestern Ontario residents camp within the same region on weekend trips. A smaller percentage (5 percent) remain within this region on vacation trips. Ontario residents within the Pinery market area, therefore, require approximately 777 user-days of camping opportunities per 1,000 population per year (Table 5).

Swimming and picnicking opportunities are sought by 65 percent and 58 percent of the residents, respectively. Since these activities are primarily associated with day-use trips, it is assumed that they will take place within the southwestern Ontario region. Approximately 3,900 user-days of swimming opportunities and 5,800 user-days of picnicking opportunities are required per 1,000 population (Table 5).

The level of participation in winter activities is difficult to anticipate in southwestern Ontario, since O.R.S. data for these activities is not subdivided into regional participation patterns. The percentages of Ontario's population participating in snowmobiling, downhill skiing and cross-country skiing are 18.4 percent, 8.1 percent and 2.7 percent, respectively. Table 6 indicates the user-day requirements, assuming that provincial participation trends are representative.

Table 5: Summer Recreational Opportunities Demand

Activity	Participation (P) (per 1,000 population)	Time (T) (per year)	Length of stay (L) (days)	Opportunities demand * (O) (user-days per 1,000 pop. per year)
Camping	130	2.6	2.3	777
Swimming	650	6.0	1.0	3,900
Picnicking	580	10.0	1.0	5,800

$$* (P) \times (T) \times (L) = (O)$$

Source: Ontario Recreation Survey, 1974

Table 6: Winter Recreational Opportunities Demand

Activity	Participation (P) (per 1,000 population)	Time(T) (per year)	Length of stay (L) (days)	Opportunities demand* (O) (user-days per 1,000 pop. per year)
Snowmobiling	184	6.0	1.0	1,104
Downhill skiing	81	13.0	1.0	1,053
Cross- country skiing	27	10.0	1.0	270

$$* (P) \times (T) \times (L) = (O)$$

Source: Ontario Recreation Survey, 1974

Table 7 summarizes the user-days of opportunities at Pinery and in the local market area (i.e. within one hour of the park). Table 8 summarizes the estimated opportunities sought by the market area residents. The latter figures were derived from population data in Table 1. All activities, except for camping, were drawn from a population within an hour's drive of the park (Michigan residents within one hour of the border). The camping market was assumed to extend to a three-hour travel zone.

The conclusions that can be drawn from the available information are limited. It is extremely difficult to estimate the exact proportion of the entire population which would travel to Pinery and vicinity for recreation activities. For instance, it cannot be assumed that the entire camping population within the three-hour travel distance zone will travel to Pinery or the immediate vicinity for a camping holiday. Numerous alternatives exist in other areas which are a three-hour drive or less from the visitor's place of origin. Similarly, a portion of the day-users within an hour's drive of Pinery are likely to travel to alternative facilities outside the one-hour market area.

The percentage of Michigan residents travelling into the market area is also difficult to estimate. The population totals within both the one-hour and three-hour travel zones have been enlarged to include 10 percent of the Michigan residents. This estimate is based on tourist travel statistics on the number of American visitors to Southern Ontario. Other Ontario, Canadian and American visitors to the market area were not included in the estimates as the percentage of representation was considered to be relatively low.

The information presented in Table 7 indicates that the opportunities for swimming and picnicking are adequate to meet the requirements as of 1974, even if all participation takes place within the one-hour drive from Pinery. Camping opportunities appear to show a slight deficit, but, since it is difficult to determine what proportion of the population is likely to be attracted to the Pinery and area facilities, a surplus of opportunities may in fact exist. Future requirements are based on present recreational patterns, but changes in leisure habits and preferences over the next 20 years could significantly alter these project requirements.

Winter facilities for downhill skiing, snowmobiling and cross-country skiing are not abundant in the Pinery area. The lack of opportunities can be attributed partly to the unpredictable winter climate. The organized snowmobile trails which presently exist provide opportunities for approximately 15 percent of the total requirements in the local market area (i.e. within a one-hour drive from Pinery). This assumes that participation is at the provincial average of 18 percent. Cross-country skiing trails are presently fulfilling 29 percent of the local market area requirements.

Since Pinery operates the only ski hill within an hour's drive of the park, it now meets less than one percent of the local opportunities sought.



Table 7: Existing Recreational Opportunities in Local Park Area\*

Activity	Pinery	One hour from Pinery	Combined total
Camping	283,500	1,807,317	2,090,817
Picnicking	1,417,500	1,802,587	3,220,087
Swimming	1,292,782	2,893,363	4,186,145
Snowmobiling	10,546	57,187	67,733
Cross-country skiing	11,392	21,262	32,654
Downhill skiing	3,500		3,500

\*Figures given are in user-days.

Table 8: Future Recreational Opportunities Demand in the Pinery Area

Activity	Opportunities sought by Ontario market area residents (user-days)*			Opportunities sought by total market area**		
	1974	1986	1996	1974	1986	1996
Camping	2,082,360	2,459,205	2,802,639	2,509,710	2,925,405	3,315,459
Picnicking	2,407,000	2,697,000	2,940,600	2,987,000	3,335,000	3,642,400
Swimming	1,618,500	1,813,500	1,977,300	2,008,500	2,242,500	2,449,200
Snowmobiling	458,160	513,360	559,728	568,560	634,800	693,312
Cross-country skiing	112,050	125,550	136,890	139,050	155,250	169,560
Downhill skiing	436,995	489,995	533,871	542,295	605,475	661,284

\*Opportunities sought per 1,000 population from population projections in Table 1.

\*\*This includes 10 percent of Michigan residents within the market area.

In summary, Pinery presently contributes 13 percent of the local camping opportunities available within an hour's drive from the park. It provides 44 percent of the picnicking opportunities and 31 percent of the swimming opportunities within the same area. During the winter, it provides 16 percent of the snowmobiling opportunities, 34 percent of the cross-country skiing opportunities and the only downhill skiing facility.



## Biophysical Resources

### Climate

The climate of the southern Lake Huron region is strongly influenced by the winds associated with the Great Lakes Storm Tract. Winds blowing over this large body of water have a moderating effect on the adjacent land area. The prevailing winds, with accompanying warm, moist air, are from the west and northwest.

During the summer months, the mean temperatures range between  $13^{\circ}\text{C}$  and  $21^{\circ}\text{C}$  (Table 8). Rainfall over this period averages approximately 8.25 cm per month. In addition, this region can expect to experience roughly 244 hours of bright sunshine in each of the summer months.

Temperatures during the winter months are well above  $-18^{\circ}\text{C}$ . January and February are typically the coldest months, with mean temperatures of  $-5.3^{\circ}\text{C}$  and  $-4.6^{\circ}\text{C}$ , respectively. During the period from November through March, the park can expect to receive approximately 205 cm of snowfall (equivalent to 20.5 cm of rainfall). Over the same period, the total mean monthly rainfall may exceed 17.7 cm.

The preceding brief description of the regional climate is based on many years of accumulated data from meteorological stations some distance from Pinery. An adequate description of the microclimate of the park is not presently available. It is possible, however, to identify specific factors which play an important role in influencing very localized conditions. The sand dunes, for instance, readily absorb heat energy from the sun during the day, but radiate this back quickly during the night. This undoubtedly results in variations in temperatures at the microscale. The orientation of the dunes and their configuration probably create very complex yet localized wind systems in a tunnelling effect. Vegetation would also influence wind patterns and temperatures but this is dependent on the height and density of growth. Slope orientation and steepness are of considerable importance in explaining differential heating at the local scale. Slopes facing south, for instance, lose their snow cover far more rapidly because of their exposure to the sun. Overall, these factors and their inter-relationship at this scale are extremely complex.

### Geology and Geomorphology

#### Regional Paleozoic Geology

The upper bedrock formation underlying the Pinery area at a depth in excess of 45 m is known as the Dundee Formation. This formation of medium-grained, light brown limestone dates back to

Table 9: Monthly Climatic Information

	Temperature (° C)		Precipitation (cm)			Sunshine (hours)
	Mean Monthly	Mean Maximum	Mean Minimum	Mean Rainfall	Mean Snowfall	
January	- 5.3	- 1.7	- 9.0	2.59	55.37	78
February	- 4.6	- 0.6	- 8.7	2.41	42.16	106
March	- 0.2	4.1	- 4.6	4.16	29.72	134
April	7.1	12.5	2.2	7.09	6.86	189
May	12.9	18.9	6.8	8.43	0.51	237
June	18.6	24.7	12.5	8.53	0.0	251
July	21.2	27.2	15.2	8.43	0.0	276
August	20.4	26.3	14.6	8.05	0.0	214
September	16.5	22.10	11.0	7.62	0.0	185
October	11.0	16.3	5.8	7.42	2.54	169
November	3.8	7.5	0.1	5.64	25.4	71
December	- 2.8	1.3	- 6.3	3.89	52.58	58



Middle Devonian age some 375 million years ago (Cooper, 1976). The formation does not outcrop in the immediate vicinity of the park, but can be observed along the Huron shoreline north of Pinery at Point Farms Provincial Park and MacGregor Point Provincial Park. Overlying the Dundee Formation is the Hamilton Formation also of the Middle Devonian age. Four members of this formation are found to outcrop in relatively close proximity to the park. The Arkona Member, Hungry Hollow Member and Widder Member are exposed south and west of the Pinery at Arkona and Thedford. The Ipperwash Member is exposed at Ipperwash Provincial Park on Lake Huron. The Arkona Member is a soft, highly fossiliferous shale, while the remaining three members are fossiliferous limestones and dolostones. The entire Hamilton Formation is well-known for its fossil content, and the Hungry Hollow Member and Arkona Member are known locally as the "Coral Beds".

The Kettle Point Formation, which outcrops southwest of Pinery at Kettle Point, is a thin-bedded grey to black bituminous shale. Embedded in the exposed rock surface are numerous spherical calcareous concretions commonly referred to as "kettles".

Underlying the Grand Bend-Pinery-Port Franks area is a large, buried bedrock river valley. This valley predates the most recent glaciation and, at one time, was the causeway for waters flowing from Lake Huron to Lake Erie.

#### Regional Quaternary Geology

There have been four major glacial episodes in Canada in the last one million years. The Wisconsin or most recent glacial period can be subdivided into three major advances separated by recessions of the ice front. As each advance of the ice largely obliterated signs of the previous advance, only sediments belonging to the Late Wisconsin time (23,000-4,000 years Before Present (B.P.)) are evident in the Grand Bend-Parkhill area.

At the onset of Late Wisconsin time (circa 23,000 years B.P.), the glacial ice advanced southward to Ohio, completely covering Ontario and the Great Lakes area. As the ice melted and receded towards the lake basins in Southern Ontario, it did so in a fluctuating manner characterized by a series of minor recessions and advances, the former of greater magnitude than the latter. A series of deposits of minor advances (tills and moraines) and retreats (lakes, shorelines and outwash) record the gradual retreat of the glacial ice mass from Southern Ontario (Figure 4).

The minor ice advances are commonly marked by a hummocky moraine ridge and associated till units. A sequence of older to younger moraines and till sheets can be observed from Kitchener to Grand Bend. The Rannoch till, associated with the Port Bruce minor advance (14,000 years B.P.), is the oldest surface till in the Grand Bend-Parkhill area. It is associated with the Mitchell, Lucan and Seaforth moraines. The St. Joseph till is the most recent in the area and represents the minor Port Huron ice advance. The outer edge of the ice is marked by the Wyoming moraine a major rise in the local topography just south and east of the Pinery.



The series of minor, fluctuating retreats of the glacial ice into the Lake Huron basin caused water to pond at the margin of the ice, forming a series of prehistoric lakes. Shorelines from several of these prehistoric lakes are present in the Grand-Bend-Parkhill area, namely proglacial lakes Arkona, Whittlesey, Warren, Grassmere, Algonquin and Nipissing (Figure 5).

There is evidence to suggest that both Lake Algonquin (12,500-10,400 years B.P.) and Lake Nipissing (5,500-3,700 years B.P.) followed the same stretch of an ancient shoreline known as the Thedford Embayment. To the west of the weakly-developed shorebluff shared by these proglacial lakes are two large features believed to represent off-shore bay mouth sandbars (Figure 4). Sedimentary structures in both features are typical of bars and the paleocurrent direction, as indicated by bedding, is from the north to the south in both places. It has been suggested that the eastern bay mouth bar may have formed during Lake Algonquin time and the western bay mouth bar, of which Pinery is a part, during Lake Nipissing time (Cooper, 1974).

The Ausable River probably drained into the Thedford Embayment during the times of Lake Algonquin and Lake Nipissing. As the waters receded, the river followed a northerly route and flowed into Lake Huron at Grand Bend. The same basic conditions that created the two large sandbars in the embayment would eventually have closed this point of exit for the Ausable. Prevailing winds, a north to south shoreline lake current and the continual deposition of sand material would have sedimented the mouth of the river and caused a gradual migration of the river mouth southward through the park area until bedrock material near Stoney Point blocked any further migration.

Sand dune formations at Pinery are the product of a dynamic process which is dependent upon wind action and a readily available supply of sand particles. The materials transported by lake action from areas north of Pinery and deposited along the shoreline, to be exposed eventually to the wind, have provided a continuous supply of material for the formation of these dunes. The present series of transverse dunes that exist at Pinery have evolved over the past 5,000 years. Those closest and parallel to Highway 21 are the first to have been formed, while those toward the shoreline are progressively younger.

### Topography

The topography of Pinery Provincial Park shows marked variations over the 2,113 ha of the park. Elevations vary from the lowest points along the Lake Huron shoreline, approximately 585 feet or 178 m above sea level, to the highest and oldest dunes running parallel to Highway 21, approximately 700 feet or 217 m above sea level (Figure 6).

The dune landscape is most pronounced in the southern and south central portions of the park, where the heights of the dunes occasionally exceed 24 m. The slopes of the dunes vary in steepness and in some instances will exceed 15 percent. In sharp contrast,

Figure 4

Moraines and Tills of Southwestern Ontario

- 1

Wyoming moraine
- 2

Seaforth moraine
- 3

Lucan moraine
- 4

Mitchell moraine
- 5

Milverton moraine
- 6

Ingersoll moraine
- 7

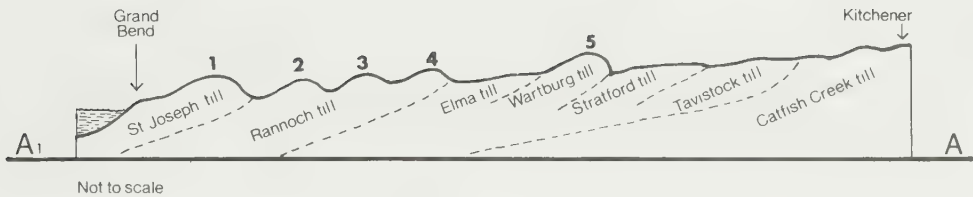
St. Thomas moraine
- 8

Norwich moraine
- 9

Blenheim moraine
- 10

Charing Cross moraine
- 11

Leamington moraine



0 10 25 50 100 km





## Geology and Geomorphology of Pinery Area

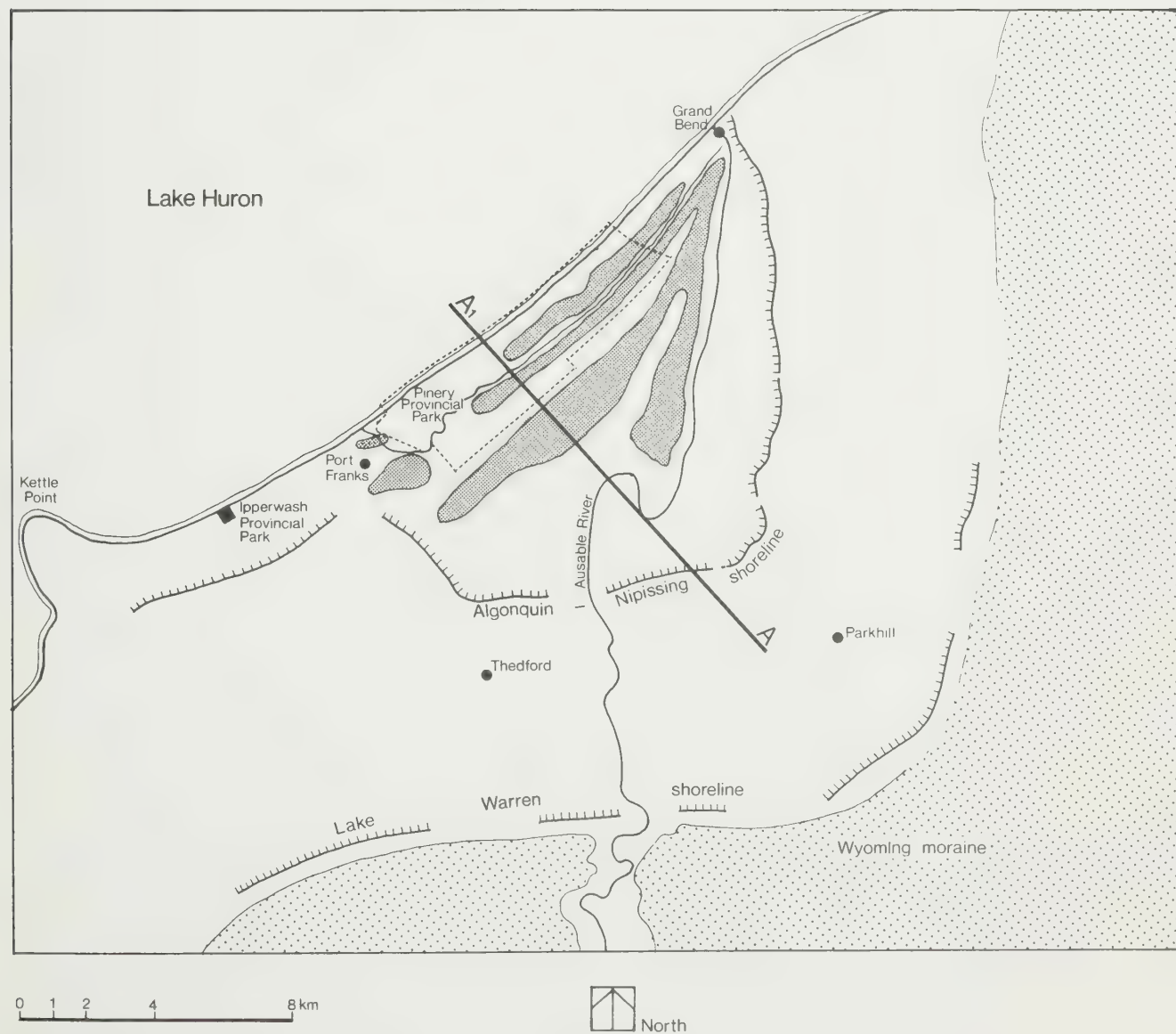
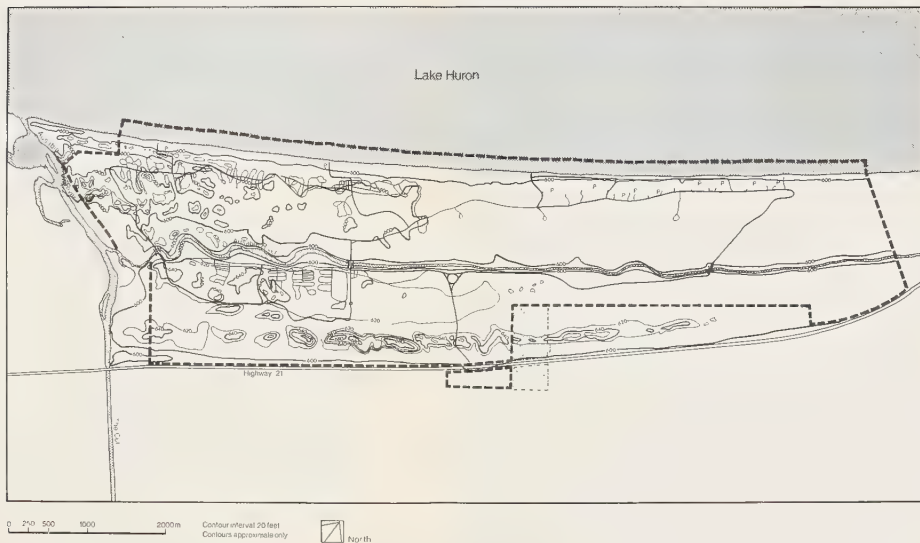
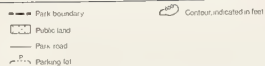




Figure 6

Topography







the central and northeastern portions of the park are relatively flat, with few areas exceeding 6 m above lake level. The exception to this generalized pattern is the oldest dune in Pinery, which runs along the entire length of the eastern boundary. From a high point of almost 700 feet or 217 m above sea level in the southwestern section, it gradually decreases in elevation towards the northeastern boundary.

The older dunes are considered to be relatively stable because of the vegetation cover, which has the effect of decreasing ground level wind velocities, binding the sand particles through root systems and blanketing the sand with a layer of humus and vegetational litter. Dunes closer to the shoreline and hence younger in origin are more susceptible to wind erosion because of the lack of vegetation cover. The grasses and shrubs, which are the first plant species to appear on the dunes, are not well-established. This is partially due to high lake levels and the impact of pedestrian traffic. The shore dunes are thus subject to relatively rapid changes in micro-topography.

The dune topography of Pinery Provincial Park is interrupted by the Ausable River valley, which bisects the park in a northeast to southwest direction. The existing stretch of water from the dam at the park's concession bridge to Grand Bend is cut off from the main river body. It is recharged through ground water seepage, springs and run-off from rainfall. The stretch of the old river south of the concession bridge flows southwest into the "cut". Water levels in this portion of the river fluctuate with changes in lake levels.

## Soils

The soils of Pinery have developed from a parent material of wind-deposited sands. The coarse nature of the soil material allows rapid percolation of moisture and the leaching of nutrients through the large pore spaces. These excessively drained soils are, for the most part, without a B-horizon in the soil profile.

There are basically three soil series in Pinery belonging to two Great Soil groups. The Plainfield Series and Eastport Series are of the Regosol Great Soil Group, while the Granby Series belongs to the Dark Grey Gleisolic Group. The drifting dune and beach sands adjacent to the Lake Huron shoreline have been classified in the Eastport Series. These areas have little or no vegetation cover, an extremely low humus content and a susceptibility to wind erosion. The Plainfield Series has developed on the dune sands which have been stabilized under a mixed forest cover. The A-horizon of yellow-grey sand can be up to 10 cm thick and is generally low in organic matter. Occasionally, a weakly developed B-horizon may be evident. The C-horizon is a yellow sand grading into grey that may be calcareous. The Plainfield Series occurs over the largest proportion of the park area.

The Granby Series, a sandy-loam type of soil, has developed along the Ausable floodplain. It is a poorly drained soil, because calcareous clay at depths of 1.2 m to 3.0 m restricts the movement of water through the sub-surface layers. The fertility of the soil is relatively low.

#### Hydrology

The Ausable River, which bisects the park in a northeast to southwest direction, is a slow moving, meandering river with a drainage basin of 414 sq km. The length of the winding river is about 480 km from the headwaters near Staffa to its mouth at Port Franks, a direct distance of about 80 km.

Settlers who lived along the river in early periods were frequent witnesses to the spring floods of the Ausable, particularly in the townships of McGillivray, Bosanquet, Stephen and West Williams. In an effort to recover some of the 6,880 ha of marshland for agriculture, a drainage "cut" was constructed from the southernmost loop of the Ausable to Port Franks in 1876. While this project was partially successful in creating some good farmlands around the Thedford area, it did have some negative effects locally. The sediments in the river flowing through "the cut" quickly began to accumulate in the Port Franks Harbour, seriously jeopardizing its future. These same sediments partially blocked the Ausable at the southern end of the Pinery area, creating additional flooding problems farther north.

It was decided in 1891 that a second "cut" be excavated at Grand Bend to drain flooded farmland. The "cut" was completed the following year, linking Grand Bend to Lake Huron and creating a small harbour. This project allowed the stretch of the Ausable running through Pinery to become a "dead" river, blocked in the south and cut off in the north.

The controlled dam at the concession bridge was built in 1962. The level of the river, which is spring fed, can be regulated from this point northward. Water in this northern section is maintained at a high level during the latter part of the year to supply the winter ski hill with water for the artificial snow-making equipment. Below the dam, the depth of the river fluctuates in relation to lake levels.

#### Flora and Vegetation

#### Regional Context

For the purpose of classifying forest productivity systems in Ontario, Hills (1959) divided the province into thirteen site regions. A site region is a climatic region in which the vegetation succession is similar on similar landform conditions, indicating the coincidence of the site region with a relatively narrow range of microclimate. Within a site region, patterns exist between plant communities and community succession and between communities and soil texture, soil moisture and microclimate (Hills, 1959).

Pinery is located in Site Region 7E, the most southerly of the site regions, near the boundary of Site Region 6E (Figure 7). The area which Hills designated as Site Region 7E corresponds closely to the "Carolinian Zone" defined by Fox and Soper (1952, 1953 and 1954). The most notable characteristics of this region are its variety and diversity of plant and animal life and its affinity to more southern ecosystems. Trees such as southern oak and hickory, tulip, sassafras, hop-tree, hackberry, magnolia and numerous other species are found only within this region in Canada. These species characterize the deciduous forests of the eastern United States and in pre-settlement times, occurred in abundance as far north as Southern Ontario. However, the magnificent hardwood forests which once extended over much of Southern Ontario disappeared as the land was cleared for agriculture. Only scattered, isolated remnants of these vast forests now remain.

North of Site Region 7E, the variety of southern hardwood species declines markedly as the transition is made into Site Region 6E, a region more suited to tolerant hardwoods and evergreens. Some hardwoods, such as sugar maple, American elm, yellow birch and red oak, are still common to the region. However, there is a marked increase in the occurrence of evergreens, such as red and white pine, spruce, balsam fir and hemlock.

Pinery, by virtue of its location near the boundary of Site Region 7E and Site Region 6E, supports many of the indigenous vegetative features of the "Carolinian Zone" at their northern limit. In addition, there are large numbers of the more northerly species which have been able to adapt to the relatively sterile soils and climatic conditions of Pinery and the neighbouring area. Their presence in this southerly location marks the southern growth limit of some northern species.

The dunes of the park no doubt presented a formidable obstacle to early exploration and settlement. Logging operations for both red and white pine were carried out quite extensively from 1825 to 1860. This early practise can be linked to the dominance of the oak forest which presently exists in Pinery Provincial Park.

#### Park Flora and Vegetation

An oak-pine forest complex dominates the mature dune landscape in the park. The dry, sandy substrates and semi-open condition of these forests harbour many distinctive shrubs and herbs. While the red oak group dominates the oak-pine forests within the park, there are at least six species of oak present. The dwarf chinquapin oak is one species which is quite common in the park, yet has an extremely restricted range in Canada.

Within this oak-pine forest complex, there are small pockets of extremely diverse and varied vegetation types. For example, the floodplain along the Ausable River supports pockets of rich deciduous forest containing tulip tree, sassafras, black walnut, and other Carolinian species. Other areas within the park exhibiting extreme plant diversity are the wet, calcareous meadows in the southwestern portion. The plant diversity in these small pockets

has attracted much attention and may well represent one of the most outstanding vegetative features of Pinery. Prairie species, such as blazing star, gentians and blue-eyed grass, are found in close proximity to blue hearts, switch grass and other plants which are local in Southern Ontario. Other species, common to the northern Bruce Peninsula but uncommon to extreme southwestern Ontario, include indian paintbrush and false asphodel.

To date, there have been some 500 vascular plants recorded in the park. Many of these are concentrated in the small, isolated pockets previously described. In addition to the uncommon trees already mentioned, the plants of Pinery include such rarities as blue hearts, green dragon, lizard's tail, green violet, ramshead orchids, ladies'-tresses orchid and dwarf hackberry.

The vegetation of Pinery Provincial Park has been grouped into seven complexes. Each of these is graphically illustrated in Figure 7. The criteria for delineating the individual complexes are based largely on physiography which directly affects the species composition and structure of the major plant communities.

#### Unforested Dune Complex

The unforested dune complex occupies a relatively narrow strip of the park property paralleling the Lake Huron shoreline. It extends from the water's edge, past the first shore dune and includes the first interdunal area and primary dune.

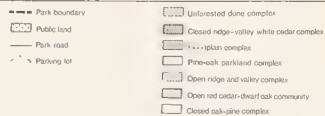
The stretch of beach from the water's edge to the shore dune is periodically inundated during storms and high lake levels. Poplar seedlings, sea rocket and wormwood occupy some locations. A short distance inland along the shore dune, the vegetation has been substantially altered by the effects of the high water levels and the pressures of pedestrian use and development. The least disturbed areas of shore dune at the north and south ends of the park support primarily shrubs, such as sand willow, sand cherry and grasses like the marram, panic grass and bluestem. The latter are extremely important, because the root systems are able to stabilize the erosion of the shore dune. In the day-use area and in locations adjacent to the campgrounds, both balsam and Carolina poplar have been introduced in an effort to stabilize sections of the beach whose appearance has been severely altered by pedestrian traffic, the subsequent loss of vegetation and the movement of sand.

The interdunal area and primary dune have sparse vegetation cover. In the relatively stable and undisturbed areas, this cover may amount to 50 percent, while in actively eroding areas the cover is reduced to approximately 5 percent. Sand cherry, juniper, sand rose and fragrant sumac occur along the dune ridges and sheltered areas. Localized clumps of red pine and red cedar grow in hollows and on dune crests. Distinctive herbs include panic grass, canal grass, marram grass, puccoon, sand wort and rock cress.

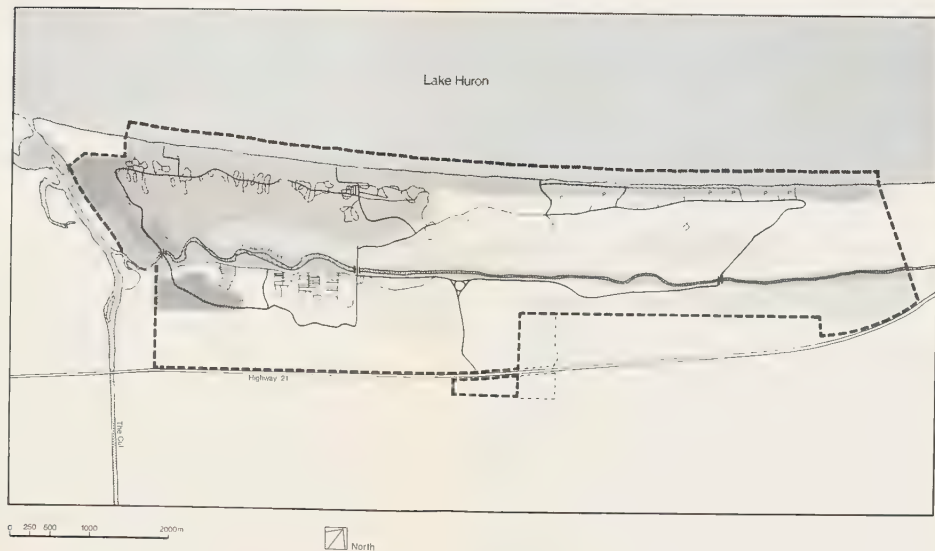
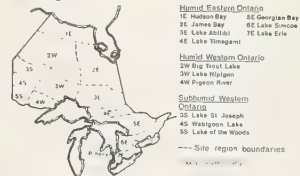


Figure 7

## Vegetation



## Site Regions of Ontario







### Closed Oak-Pine Complex

This particular complex covers the largest area in Pinery, dominating mature dune areas of low relief for the entire length of the park. The predominant tree species, which provide approximately 70 percent cover, are the black oaks and the red oaks, averaging 14 m in height. Red cedar and red pine are present, along with white pine less than 2 m in high, planted in the last ten years. New Jersey tea, columbine, sand rose and bearberry are common in the lower layers. Along the ridge tops of the oldest dunes paralleling Highway 21, dwarf hackberry, witch hazel and round-leaved dogwood are fairly abundant.

At the south end of the park between the oldest dune and the highway, there is a small, flat triangular section where sassafras is very much in evidence among the large oaks and pines. The herb layer includes a variety of grasses and poison ivy.

### Pine-Oak Parkland Complex

The pine-oak parkland complex covers an extensive portion of the park property. It includes not only the relatively undisturbed, centrally located areas but also two areas of recent and older burns in the northeast part of the park.

Oaks and red pines are the dominant tree species of this complex. Tree cover ranges from 70 percent in the undisturbed and older burn areas to 20 percent in the areas which experienced burns 10 to 15 years ago. Some white pines have been underplanted in the least disturbed areas to replace those removed by logging. Black cherry, fragrant sumac, New Jersey tea and white pine dominate the shrub layer. The herbs growing in these areas are bracken, needle and thread grass, poison ivy and big bluestem.

### Open Red Cedar-Dwarf Oak Community

On the west side of the Ausable River and opposite the Riverside Campground is a grouping of widely scattered black oak and red cedars reaching some 12 m in height. The secondary growth consists of shrubby clumps of dwarf oaks and fragrant sumac reaching 1.5 m to 6 m in height. The semi-open cover allows a wide variety of sun-loving herbs including wormwood, blazing star, puccoon, sand wort and little bluestem. The factors which have contributed to the establishment of this complex have not been fully determined.

### Open Ridge and Valley Complex

The open ridge and valley complex consists of dry and wet interdunal meadows, interdunal wooded areas and open ridge tops. It is located within an area of the park which has extremes in relief, and consequently, there are dramatic variations in habitat types. The wet meadows lie between a system of 1.5 m dune ridges and are among the lowest areas at Pinery apart from the river and lake. The small, steeply sloped valleys are found between the high dunes in Burley Campground which reach heights of 18 m or more.

The dry meadows are low-lying grassy areas not exceeding 8 ha in size, which have a scattering of chestnut oaks and red cedars. Tree cover is sparse. This pattern is repeated in the shrub layer, thus producing a grouping or clumping of vegetation. Scattered dwarf oak are common along with white pine. Wormwood, blazing star, bush clover and bearberry are an important component of the ground cover.

The wet meadows, each approximately 2 ha in size, are located within the Burley Campground. Plants, such as autumn ladies' tresses, blazing star, gentians, kalm's lobelia, indian paintbrush, false asphodel and arrow grass, flourish in these habitats. Blue hearts, a species with a very restricted distribution in Ontario, is fairly common to two of the wet meadow sites.

Between the high dunes in the Burley Campground are a number of small, steeply-sloped valleys. The scattered communities of trees and plants which grow in these locations are influenced by the localized microclimate and slope conditions. Tree cover consists of white pine, red pine, white birch and white cedar. Round-leaved dogwood, cherry and honeysuckle make up the dense shrub layer.

Along the ridge tops, the size and distribution of plants is greatly reduced. The low moisture retention capabilities of the soil, the high temperatures and the steep slopes have a direct bearing on the patterns of growth. The cover of mostly red and white pine and red cedar is sparse. The shrub layer is composed primarily of low juniper, fragrant sumac and dwarf oak.

#### Closed Ridge-Valley White Cedar Complex

This heavily forested segment in the south end of the park is associated with the area of greatest topographic relief. A dense stand of 12-m high white cedars grow in a low-lying area on the western edge of the Burley Campground. The thick overstory allows only a minimal amount of light to penetrate through to the forest floor. Thus, ground cover is restricted to a mat of mosses and lichens. This absence of ground cover, coupled with the area's susceptibility to inundation during high water levels, makes this part of the park a sensitive area.

Moving southward towards the Ausable River, the tree and plant communities take on a different character. The dominant tree species, comprising 75 percent of the overstory, are red and chestnut oaks, with red and white pine, basswood and red cedar as additional components. Shoreline species are in evidence on the ridge tops and upper slopes where common juniper, bearberry, puccoon and wormwood commonly occur.

#### Floodplain Complex

The floodplain complex includes the ash forest on the west bank of the Ausable River close to the "cut", the individual floodplain communities along the length of the river, the hardwood forest just south of the day-use bridge and the river itself. Much of the land

is barely above water level and thus is frequently wet. The soils are characteristically rich in organic material. Consequently, the riverscape contrasts sharply with the drier, more sterile sandlands which dominate the park.

The ash forest to the west of the river contains a variety of tree and plant species. Close to the river, poplars, grey dogwood thickets, willows and ninebark are common. A short distance inland, an impressive wooded area supports ash, red oak, tulip, black cherry and red maple. The shrubs include round-leaved dogwood, chokecherry and several viburnums. Ferns, such as maidenhair, rattlesnake, marsh fern and bulbet fern, are also common.

Components of the floodplain community can be found along the length of the river. Above the concession bridge dam, the distinct fringe of herbs and shrubs is relatively narrow; however, it widens considerably in the meanders below this point. Dogwoods grow in abundance, although ninebark, bladdernut and cattails are also common to particular locations. Flowering plants, such as arrow grass, water plantain, green dragon, lizard's tail and blue flag, are found in this segment of the park, making it one of the most attractive areas of Pinery.

The ash forest just south of the day-use bridge is a small area supporting red ash, silver maple, basswood and shagbark hickory. The understory is dominated by viburnums, grey dogwood, wild rice and green violet, of which the latter is found only in the extreme south of Ontario.

The aquatic vegetation that the river supports is influenced by a variety of conditions. The principle factors include fluctuations in water depth, low flow and warm temperatures. These ensure the presence of such species as yellow pond lily, water weed, duck weed and pond weed.

#### Fauna

Pinery Provincial Park offers excellent cover and a breeding territory for a wide variety of migratory and resident birds, as well as amphibians, reptiles and small mammals. Its value in this respect and in the diversity of habitat offered is significant, particularly since the park has the distinction of being the largest single tract of "forested" land in Lambton County.

Twenty-nine species of mammals have been recorded in Pinery. These include a variety of the smaller species such as the eastern grey squirrel, the eastern fox squirrel, the eastern chipmunk, the meadow jumping mouse and the white-footed mouse. Larger species, such as beaver, raccoon, red fox, striped skunk and long-tailed weasel, are also found. The largest mammals to be seen in Pinery are white-tailed deer. A small herd presently exists; however, the exact numbers are not known.

Just over 200 species of birds have been observed at the park. Sightings include a wide variety of geese and ducks which rest along

the Ausable River and the lake shoreline during their migratory stop-over. Migrating loons are frequently spotted in the fall months and as many as 3,000 have been sighted along the lakeshore in a two-hour period. Over 20 different species of warblers have been recorded. Both the prairie warbler and cerulean warbler nest in the north shoreline vegetation of the park. The prairie warbler is of particular interest, since its occurrence is very localized in Ontario. The extensive coniferous cover of Pinery is important in attracting a large winter finch population. Other species found include crossbills, redpolls and grosbeaks.

The eastern hog-nosed snake, an uncommon reptile in Ontario, has been found along the shoreline dunes of Pinery. Other snakes found include the northern water snake, the eastern ribbon snake and the eastern smooth green snake. The eastern smooth green snake is frequently seen along the grassy margins of the Ausable River.

Many species of butterflies exist within the park. The most noted are the olympus, the dusted skipper, the delaware skipper and the leonardus skipper.

The fish population in the Ausable River includes pike, perch and sunfish. Carp are commonly found in the turbid sections. Each year, trout are released in the northern sections of the river to increase the local opportunities for fishing.



## Cultural Resources

### Prehistory in the Pinery Area

Within the Pinery area, roughly coincident with lands lying within a 32-km radius of the present park, the earliest known inhabitants (9,000-7,000 B.C.) were Paleo-Indian hunting and gathering people. Archaic people from hunting and gathering societies occupied the area from approximately 7,000 to 800 B.C.

The Saugeen people are associated with the area from around 600 B.C. to 300 A.D. They travelled in small groups, moving from one area to another as the seasons changed. Big and small game hunting, fishing, berry and nut gathering were their principal occupations, and they made intensive use of specific ecological zones. The Pinery area appears to represent one or two segments of their seasonal travels. While the burial practises of these people were relatively elaborate, no such sites have yet been found at the park.

The disappearance of the Saugeen people and the emergence of the Princess Point culture are not fully understood. In the Pinery area, it appears that this cultural change reflects the adoption of southern occupations, notably pottery making, by the local people, rather than the influx of new people on the culture. From what is known of the Princess Point culture (circa 500-800 A.D.) in the Pinery area (known as the Ausable Focus of the Princess Point Complex), it appears that they had much the same type of lifestyle as the Saugeen culture. The Princess Point culture introduced horticulture into Ontario, involving the cultivation of corn and squash, but no evidence of this remains in the park area.

Following this period, native people probably visited the area to obtain lacustrine food resources and chert for tool manufacture. Pinery was within a tension zone between conflicting Iroquoian and Algonkian-speaking people during the 16th and early 17th centuries. There is evidence that native people utilized Kettle Point chert as late as the mid-17th century.

### Prehistory in Pinery Provincial Park

A preliminary archaeological survey was undertaken within the park in the summer of 1972. During the survey period, a total of 52 prehistoric sites were located along the Ausable River. The cultural affiliations of 26 of the sites were identified. Fifteen sites were recognized as belonging to the Saugeen culture (circa 600 B.C.-300 A.D.). Eight other sites were tentatively identified as belonging to the same cultural period. Three more sites were identified as belonging to the Princess Point culture (circa 500-800 A.D.)



It is known that the lands along the Ausable River were utilized by at least two identifiable cultural groups over an extended time period. The sites located seem to represent the seasonal encampments of groups of people whose survival and cultural development were in part related to the paleo-environment of the Pinery area. This series of relatively undisturbed sites represents one of the few known opportunities in Southern Ontario to conserve and interpret the cultural activities of prehistoric native people.

#### Early Explorers

It is possible that Etienne Brulé, Champlain's protégé and "ambassador" to the native peoples, travelled through this area in the early 17th century. However, no documentary evidence exists to support this belief. Later, two missionaries, Dollier deCasson and Gallinée, passed through the area and described a river on their map of 1670 which may be the Ausable River. It was not until the 19th century that the river was actually named on a map.

Much of the exploring after the 17th century was undertaken by missionaries. Stories persist of an old Jesuit mission which is supposed to have existed within Pinery and has since been buried by sand. No tangible evidence to support this story has been discovered.

#### Early Settlement

In 1826, the Government of Upper Canada sold 404,700 ha (the Huron Tract) to the Canada Company for resale to settlers. The area comprising Pinery Provincial Park was part of this sale. By 1834, settlers had begun to clear the land along the roads built by the Canada Company. Some of this settlement took place in the Pinery area. Captain Samuel Burley owned part of the existing park property. Two Americans, Smart and Brewster, established a sawmill in Grand Bend and by 1835 had enlarged their holdings to include three mill sites and 904 ha of timber land. Some of this land bordered on the northern boundary of the park, and some lumbering operations took place within the park itself.

Few settlers ventured into the wilderness areas of Bosanquet Township prior to 1850. The influx after this date may have been partially due to the completion of the Lake Road (now Highway 21) to Goderich. Between 1850 and 1860, the communities of Port Franks and Grand Bend became small thriving centres. Port Franks became a significant frontier port for the export of lumber to Goderich and the Detroit area. In addition, salt and brine mined locally were exported. Grand Bend became an important lumbering centre, with sawmills, a grist mill and new roads to attract settlers. Lumbering operations were of some importance in the immediate Pinery area. Frequent forest fires took their toll on young growth and swept through the park area wreaking havoc with the lumbering industry.

The lumbering and fires soon destroyed the marketable stands of pine, which were subsequently replaced by the particularly fire-resistant oaks, and Pinery's value as a source of timber declined.

#### Recent History

Between 1954 and 1956, the Canada Company sold the Pinery holdings to the Pinery Corporation Ltd. One year later, 1,700 ha were sold to the Ontario Government to establish a provincial park. Pinery was officially formed on October 11, 1957 by Ontario Regulation 299/57, which was amended by Ontario Regulation 498/60.

On October 23, 1963, an additional 183 m of property extending out from the shoreline of Lake Huron was added to the park. On May 14, 1965, part of Lots 31-34 Lake Road West Concession, Bosanquet Township, were purchased by the then Department of Lands and Forests. On January 9, 1967, Lots 9 and 10 and the bed of the Ausable River, Lake Road West Concession and part of Lots 9 and 10, Lake Road East Concession, Bosanquet Township were added to the park.

## Natural and Cultural Features Evaluation

Pinery Provincial Park is recognized as an outstanding landscape with geomorphological, biological and historical features which assign it a particular value in the Provincial Parks System. The development of existing facilities was undertaken at a time when environmental concerns were not strongly voiced. As a result, some facilities have been located on sites which are especially vulnerable to intensive use. The impact of this use and the consequences in future years have now been recognized. The challenge in the future development of facilities and in the management of existing facilities is to ensure that steps are taken and procedures followed which will minimize the impact of recreational use on a delicate landscape.

An exercise was undertaken to evaluate the park for management purposes. The evaluation process considered all the natural and cultural features which have been identified to this point (Figure 8). The process required that judgements and decisions reflect the philosophy of the Ontario Provincial Parks System in meeting the objectives for outdoor recreation and preservation in Ontario. Developed areas of the park have been excluded from this evaluation, because these sites have already been disturbed and altered from their natural state.

In assessing the natural and cultural features of Pinery Provincial Park, it is recognized that the total value of the features, their inter-relationships and the processes at work within the total park environment are of greater importance than the value of individual features. Notwithstanding this fact, an assessment of environmental features was carried out to determine the relative ranking of individual areas of natural and cultural value within the park. The criteria used to assess the natural and cultural values of the park included the following:

- archaeological sites
- The Wilderness Areas Act designations
- vegetative complexes
- geomorphological/geological features
- prime wildlife habitat
- natural and cultural features having strong interpretive values
- undisturbed cross-sectional representation illustrative of the chronological, geomorphological and vegetative evolution of the park landscape.

A scoring system was utilized whereby locations exhibiting several of the above criteria received a higher ranking than the areas possessing only one of the identified criteria. The results of this evaluation process are shown in Figure 8.

Despite its limitations, this assessment contributes towards the identification of those sites requiring particular recognition to ensure minimal disturbance in the future. In addition, the evaluation highlights areas of prime interest for interpretive programming.

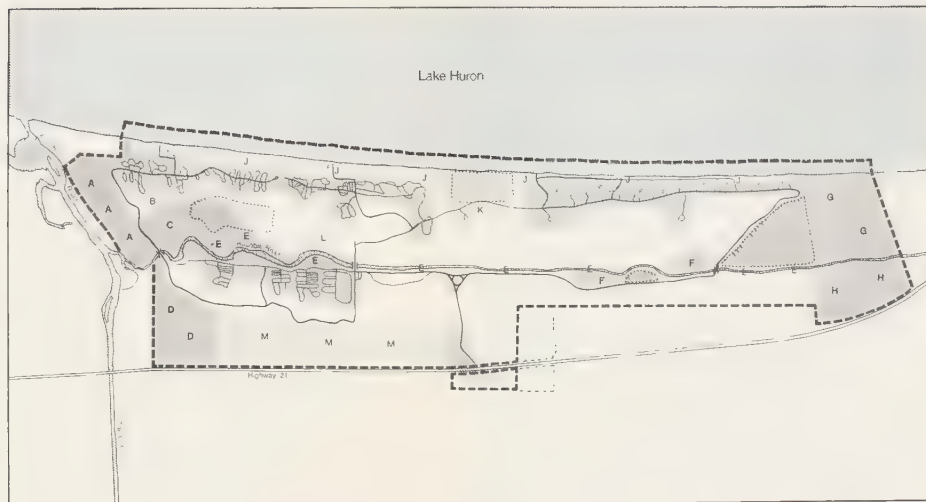


Figure 8: Natural and Cultural Features Evaluation

- A - prominent earth science features; high dunes
  - Carolinian forest species
  - dry meadows
  - hog-nosed snake habitat
  - important bird nesting site
- B - wet castilleja meadows
- C - area of least-disturbed dunes
- D - scattered dwarf hackberry, sassafras and dwarf oak
- E - archaeological sites
  - beaver habitat
  - significant riverine vegetation (i.e., lizard's tail, green dragon, green violet)
- F - high plant diversity; ash-hickory complex
- G - representative oak-pine associations
- H - area of recent burns
- J - primary dune system
- K - prairie warbler habitat
  - olympus butterfly habitat
  - significant dune vegetation occurrences (i.e., sea rocket)
- L - dry meadow
  - dwarf hackberry and red cedar stand
- M - area of highest and oldest dunes
  - oak tree diversity

Figure 8

# Natural and Cultural Features Evaluation



0 250 500 1000 2000m







## Park Policy

The Pinery landscape has evolved over many thousands of years through the complex interaction of natural forces. Early man left evidence of his hunting, fishing and food gathering. Later arrivals to the area found little use for the rolling acres of sand dunes and pine forests.

Today, the landscape is used extensively for recreational activities. The very features which attract the visitors to the park may in turn suffer irreversible damage if steps are not taken to ensure their protection and conservation. All efforts must be made to retain the natural and cultural features which form a part of the provincial heritage.

## Park Goal

The goal of Pinery Provincial Park is to provide a range of intensive and extensive year-round recreational opportunities, while conserving a natural environment setting which has recreational, scientific and interpretive significance.

## Park Objectives

- To ensure the protection of important geomorphological, biological, historical and archaeological features through the application of appropriate management techniques.
- To provide summer camping and day-use opportunities in the existing designated areas of the park, with appropriate facilities and management practises to minimize the impact on resource features.
- To provide winter facilities in designated areas of the park for activities which are compatible with the natural, historical and cultural values.
- To provide a visitor services program which will be an integral part of park management and which will promote the park values and activities.
- To encourage the systematic scientific investigation of the various resource features to promote a greater understanding of park values and to encourage the refinement of management guidelines.

## Park Classification

Pinery, by virtue of its aesthetic, biological, geomorphological, cultural and archaeological values is designated as a natural environment park under the present Ontario Provincial Parks Classification System.

## Park Zoning

The park is divided into five zones as shown on Figure 9. Each zone provides for the appropriate level of development, the range and types of activities and the appropriate management guidelines to achieve the objectives of the park.

### Access Zone

The access zone represents a small area of the park at the existing entrance off Highway 21. The entrance control facilities are located in this zone.

### Development Zone

The development zone includes the areas of the park which have existing facilities for camping, summer and winter day-use activities. In addition, this zone includes all roads which are used extensively by vehicular traffic.

Dunes Campground and Burley Campground provide a total of 773 campsites for summer camping. Some sites are closed each year for rehabilitation. No additional sites will be developed. Access to the beach is by car to one of the two parking lots or by foot across the dunes. The latter access is causing severe damage and erosion to the dune structures. After finding appropriate means of transporting campers from the campgrounds to the beach, the damaged areas will require extensive rehabilitation.

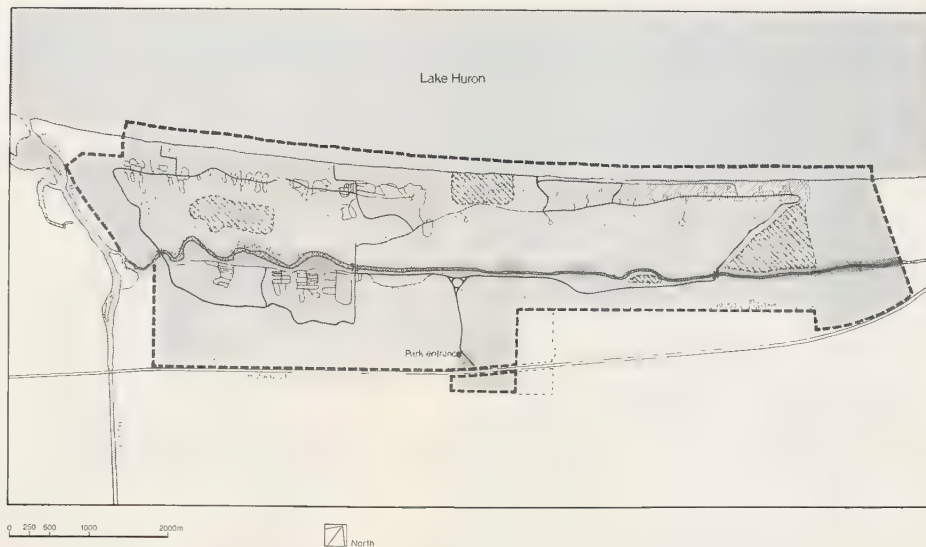
Riverside Campground presently contains 494 campsites, of which 130 are equipped with electrical outlets. The electrical sites are the only sites kept open on a year-round basis. The rehabilitation of over-used sites will continue and no additional campsites will be developed. Electrical sites will be maintained at their present level.

The concession, amphitheatre, administration office and maintenance complex are included in the development zone. These existing facilities require attention in order to alleviate their individual problems. Alterations are minor and will be undertaken with the least possible disturbance to adjacent features.

The winter activities site will remain in its present location. It will be closed during the summer months. The entrance road will be relocated to provide entry from the northwest, off the day-use road. No major addition to the existing facilities will be undertaken.

Figure 9

# Zoning





The day-use area includes nine parking lots with a capacity for 1,100 vehicles, three group camping areas and beach facilities. Extensive studies will be undertaken to evaluate the site and to determine the most appropriate means of transporting visitors from the parking lots in this area to the beach. Rehabilitation programs will be implemented in those areas where pedestrian traffic has caused severe damage to the dune formations. Picnic nodes will be developed in locations adjacent to the parking lots after intensive site evaluation. The concession building will be relocated to a more accessible site for day-use visitors. Change facilities will be moved to the parking lot vicinity so that the visitors can leave their possessions in their cars before going to the beach.

Development along the roadways will be limited. The visitor services centre will be located in the vicinity of the traffic circle in order to be accessible to all park visitors. Road patterns at this junction will be redesigned to incorporate this facility. A limited number of individual picnic sites will be developed along the day-use road. These sites will be for one or two vehicles only. Site selection will follow a more detailed survey of archaeological resources in the proposed area.

#### Historical Zone

The entire stretch of the Ausable River and its banks will be zoned as an historical zone to protect the locations of significant archaeological sites. .

Activities within this zone will be passive and will include fishing, canoeing, boating and hiking on designated trails. Development will be restricted, but may include individual picnic sites.

Approved and licensed scientific investigation of archaeological sites will be permitted. The ultimate disposition of recovered artifacts will be at the discretion of the Minister of Culture and Recreation as outlined in The Ontario Heritage Act, 1974. However, it is assumed that materials will be made available to the park for interpretive purposes.

#### Nature Reserve Zone

Two sections of the park at the north and south ends are zoned as nature reserves. These relatively undisturbed areas of the park landscape illustrate the features and processes which are an integral part of Pinery. In addition, these areas represent the vegetational stages which are closely related to the formation and stabilization of the dune features. The primary purpose of this zone will be to conserve significant natural features and to provide opportunities for related research and educational programs. No development, with the exception of trails, will take place in the nature reserves. Activities within the zone will be limited to passive forms of recreation such as nature study, hiking and cross-country skiing on designated trails.



Three additional areas in Burley Campground will be designated as nature reserves. These areas, known as the wet meadows, exhibit such extreme plant diversity that they may well represent one of the most outstanding vegetative features of Pinery Provincial Park. Two of these areas are presently surrounded by fencing and can be entered only when accompanied by park staff. The third area will be protected in the same manner.

#### Natural Environment Zone

The largest portion of the park will be classified as a natural environment zone. This area includes some of the least disturbed examples of dune landforms, just east of the Burley Campground. In addition, it includes some of the oldest and highest dune features to be found in Pinery. The older dunes support the well-established and more stable plant associations. This zone also includes a stretch of shore dune between the day-use facilities and Dunes Campground.

This zone will provide for extensive recreational activities, such as guided hikes, cross-country skiing, viewing and nature study. Snowmobile trails which run through a small portion of this zone will remain in their present location.



## Visitor Services

The visitor services program at Pinery Provincial Park will provide the means and the opportunity for visitors to experience the full range of recreational, interpretive and educational potentials of the park on a year-round basis. This can be accomplished through the appropriate balance of services, facilities and programs. The visitor services program will be fully integrated with all other park functions and operations in order to provide the optimum level of service.

The program will be flexible and adaptive to visitors' needs to the extent permitted by park management policies. Furthermore, it will be compatible with the interim policy outlined for the Provincial Parks Visitor Services Program (Ontario Ministry of Natural Resources, 1976).

Pinery will be given the status of a "nodal" park. This designation applies to key parks selected from the Provincial Parks System which are capable of offering high quality and high contact programs oriented towards the interpretation of regionally significant and representative natural and historical features. The administrative structure and expertise of a nodal park's program can be utilized by the smaller programs in the surrounding "satellite" parks. Ipperwash Provincial Park falls into this latter category.

The underlying theme for the visitor services program at Pinery will centre on the components of the dune landscape and their associated vegetational features. The emphasis will be on the natural transformation of the landform and its use by man over time.

The program will consist of four interrelated components: communications, interpretation, outdoor education and recreation. The following explanations are arranged in order of emphasis according to staff programming. Seasonal variations among user groups may require one component to be emphasized more than another. For instance, the outdoor education component would assume a more prominent role during the fall and spring months when university and secondary school groups visit the park.

### Communications

The communications component is a basic service provided by all parks. It is primarily a means of informing the potential visitor about the Provincial Parks System and how to make optimum use of it. At Pinery, the program will include the production and distribution of newsletters and brochures orienting visitors to the park, its facilities, its programs and rules and its local attractions. In addition, the media, local communities and the general public will be informed of programs and events of a special nature offered by the park. This component will also be a means whereby information will

flow among park staff so that all are aware of the park programs, their role at Pinery and the staff's obligations to the public. All park staff will be considered as visitor service personnel and will be encouraged to maintain an active dialogue between park visitors and management.

### Interpretation

The interpretive component will be directed towards all visitors to the park. Its primary objective will be the interpretation of the biophysical, historical and archaeological features of the park within the regional and provincial context. A variety of aids will be used to assist the visitor in fully understanding the significant features of the park. Some will be of the self-use variety, such as displays, publications, self-guided trails and audio visual programs. Others will be organized by park staff. These will include guided hikes, evening programs at the amphitheatre, programs through mobile unit, bicycle and canoe excursions and demonstrations. The interrelationship of resources, management principles and visitors will be a central theme throughout the program. Activities and programs will be dispersed throughout the park. However, the proposed visitor services centre will be a focal point for all visitors to obtain information on a year-round basis.

### Outdoor Education

The outdoor education program at Pinery will encourage school groups to make the best use of the park resources and facilities for outdoor education. Ministry policy regarding the role to be assumed by the park visitor services personnel is presently being formulated. In the interim period, assistance to teachers will take the form of information packages to assist them in interpreting the features of the park to their students. Facilities in the proposed visitor services centre will be made available to school groups for presentations and discussions. An updated collection of material and references will be available in the resource library of the visitor centre. Access to this information will be given to scientific groups under the supervision of the visitor services programmer.

### Recreation

The recreation component of the visitor services program at Pinery will be low-key. Neighbouring provincial parks, such as Point Farms and Ipperwash, will provide facilities and personnel for more active programs, fitness trails, horseshoe tournaments, etc. Active and organized recreation programming may come about as a secondary benefit of the interpretive component. Bicycle and canoe excursions and guided hikes in the summer and winter may be used by some visitors for strictly recreational purposes. However, the programs will focus on the interpretive aspect.

The natural, historical and archaeological features of Pinery and the surrounding area add special value to the park. The visitor services program will be an integral part of the park's operation and will attempt to provide all the assistance possible to visitors who wish to broaden their understanding and appreciation of the resources and man's relation to them. The special status assigned to Pinery will be reflected in all aspects of the visitor services program. The proposed centre, accessible to all visitors, will be the focal point of a program which will influence all parts of the park from the entrance control booth to campground offices, trails, the amphitheatre and the maintenance complex.





## Development Program

All existing facilities at Pinery Provincial Park have been reviewed during the planning exercise. Some areas of concern have been identified and require attention in the immediate future. Some alterations or additions to facilities are proposed in order to improve the quality of recreational opportunities being offered to the public and to raise the level of services presently available (Figure 10). All proposed alterations or additions are acceptable within the guidelines for the development of a natural environment park.

### Visitor Centre and Amphitheatre

Pinery's status as a "nodal" park within the provincial visitor services program defines a basic level of service to be provided to the public. As a focal point for all visitor services functions at the park, a centre is required which will be accessible to all park visitors on a year-round basis. A location has been suggested in the vicinity of the park traffic circle. The centre will include such facilities as an entry and information area, an interpretive area, an indoor theatre to double as a "special functions" room and office space. Parking for approximately 45 vehicles would be necessary. Since the suggested location for the centre occupies an area in the vicinity of the park traffic circle, the intersection should be redesigned to ensure a safe and efficient flow of traffic.

The amphitheatre will remain in its present location. However, some alterations are required to improve the existing facility. A parking lot with a capacity for approximately 100 vehicles is required to alleviate traffic congestion. The seating arrangements need to be redesigned to accommodate a maximum of 750 people at an evening program.

### Administration Office and Maintenance Complex

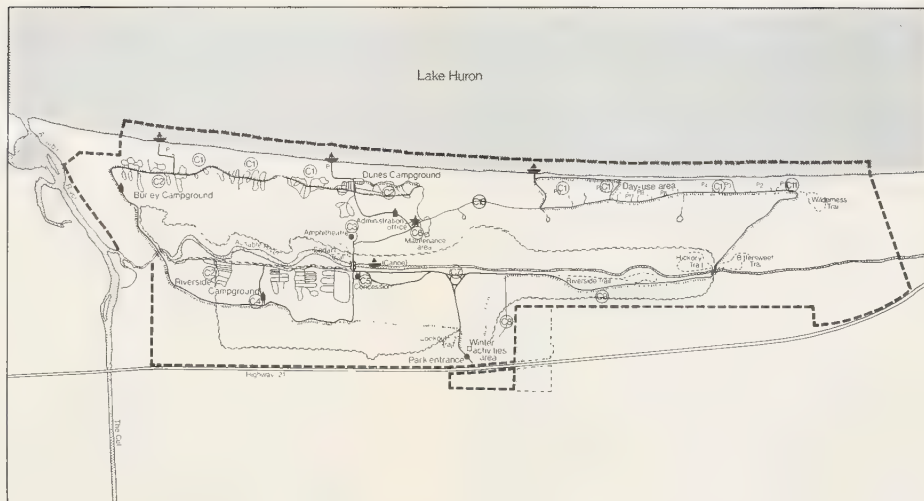
The park administration office will remain at the present site which is centrally located for all park operational functions. This building will provide offices for the park superintendent, the assistant superintendents, the visitor services programmer and accounting and clerical staff.

The administrative function of this office complex should remain separate from the daily, routine inquiries of the visiting public. The latter service can be adequately provided through the visitor services centre, campground offices or other public contact points. The administrative staff would, however, deal with all public inquiries which could not be answered at these locations. Since the administrative function is not conducive to daily contacts with the visiting public, an evaluation of existing roadways, circulation patterns and traffic flows

Figure 10

Master Plan  
(Proposed Changes)

- Park boundary
- Public land
- Park road
- P Parking lot
- Hiking trail
- Cross-country ski trail
- Snowmobile trail
- Boat launch
- Campground office
- Group camping
- Bridge
- Proposed change
- ① Pedestrian dune crossing structures
- ② Shower facilities
- ③ Redesign of amphitheatre
- ④ Redesign of campground entrance
- ⑤ Redesign of concession facility
- ⑥ Redesign of administration office and maintenance area
- ⑦ Visitor services centre and redesign of traffic circulation
- ⑧ Road to winter activities area
- ⑨ Day-use picnic area
- ⑩ Road closed to traffic
- ⑪ Day-use concession facilities







within the immediate vicinity will be undertaken prior to any redesign and alterations of the site.

The Ontario Provincial Police detachment office which is presently located in the administration complex, may be relocated to an alternative site outside the present park boundary.

The maintenance complex is presently undergoing partial redevelopment to improve facilities. This will be phased over the next three to four years.

#### Day-use Areas

The drive beside the Ausable River taken by visitors travelling to the beach facilities in the north section of the park is one of the most scenic routes accessible to day-users. At present, there are few opportunities for these visitors to enjoy the tranquil and scenic qualities offered by this important resource feature. To provide access to the river for individual day-use groups, a number of small picnic sites will be developed, each large enough to accommodate the occupants of two cars. The location of sites will be selected so as not to disrupt or infringe upon important archaeological and/or biophysical resource features. The maximum number of developed facilities will not exceed 15 sites.

The day-use beach and parking facilities will require extensive site evaluation and site planning. The fragile nature of the dunes between the beach and parking facilities will require in-depth study to determine the best possible method of sustaining pedestrian traffic resulting in the least amount of disruption to the dune system. Specific sites adjacent to the parking lots will be developed as picnic nodes for day-use visitors. Parking facilities will not be enlarged as the present capacity is adequate for current and projected use.

A new site for the day-use concession facility will be chosen, as the existing site is poorly located and inaccessible to many park visitors.

#### Winter Activities Site

The public land lying just outside the park boundary to the northeast of the park entrance will not be developed as the centre for winter activities in the near future. The potential of the site for downhill skiing is recognized, however, the use of existing facilities and the unpredictable climatic conditions make this an uneconomical alternative at present. The options for future utilization will remain open and will be studied in future reviews of the plan. In the interim, efforts will be directed toward improving the existing winter facilities. The access to the present winter activities site will be changed so that the approach to the facilities will be from the northwest, off the day-use road. The road will be located with the least amount of redevelopment to provide access to the aforementioned public land, should the site become the centre for winter activities in the future.

## Shower Facilities

There are presently no shower facilities for campers staying in the park, even though in recent years a large segment of the camping public has come to expect this in public camping facilities. In light of public desire for such facilities, showers will be provided in each of the three campgrounds at Pinery. These facilities will be provided in existing buildings which may have to be modified to provide for the additional space requirements.

## Internal Roadway System

Specific locations within the internal roadway system of the park require redesigning to eliminate confusing and hazardous conditions. The locations are listed below:

### Traffic Circle

The intersection at the traffic circle requires an analysis of traffic flow patterns and the necessary adjustments to ensure the safe and efficient movement of traffic. The evaluation will take into account the proposed location of the visitor services centre. In addition, the control office directly south of the traffic circle will be removed and a kiosk will be placed at a point favourable to the monitoring of both camper and day-use traffic.

### Winter Facilities Roadway

The existing roadway into the winter facilities site is both hazardous and confusing to visitors. This roadway will be closed and will be relocated off the day-use road.

### Concession Roadway

The intersection near the concession stand and the bridge will be redesigned to eliminate the congestion and the confusion which presently exist. Approach roads, entrances and parking facilities will be considered.

### Day-use Roadways

The roadway from the most southerly day-use parking lot to the administration offices will be closed to visitor traffic. The group campgrounds will be accessible only to groups with reservations. Service and emergency vehicles will also be permitted to use the roadway.

The road along the beach in front of Parking Lot 8 and Parking Lot 9 will be closed to visitor traffic after the redevelopment of the day-use area. Roads to the beach from Parking Lot 1 and Parking Lot 3 will be closed during this same period.

## Campground Roadways

The entrance roadway to Riverside Campground cannot presently handle the volume of traffic during busy weekend periods. Vehicles parked along the main roadway are both a hazard and an inconvenience to campers registered at either Riverside Campground or Burley Campground. A method of alleviating this problem will be investigated and implemented.

A flooding problem exists on the stretch of road adjacent to the fenced wet meadow in Burley Campground. Some work will be undertaken at this point to eliminate further flooding.

Sharp curves create a hazard to vehicular traffic in at least three locations. These curves will be redesigned to improve the visibility of traffic.

## Implementation Phasing

The following represents the implementation and phasing of the development program. The information given on the staging period indicates the estimated number of years before completion of the stage from the time the particular stage begins. However, the programs will be started and completed at various times in the future as funds and priorities permit.

<u>Development Program</u>	<u>Planning Requirement and Monitoring Program</u>	<u>Staging Period</u>
Maintenance complex	<ul style="list-style-type: none"> <li>- Site plans completed</li> <li>- Development plans completed</li> <li>- Initial phases of construction began June, 1976</li> </ul>	3 years
Internal circulation (sharp curves)	<ul style="list-style-type: none"> <li>- Archaeological survey (site specific)</li> <li>- Site plans</li> <li>- Development plans</li> </ul>	2 years
Day-use facilities (river picnic sites)	<ul style="list-style-type: none"> <li>- Archaeological survey (site specific)</li> <li>- Site plans for a maximum of 15 picnic sites along the day-use road to the north bridge</li> <li>- Development plans</li> </ul>	2 years
Amphitheatre	<ul style="list-style-type: none"> <li>- Site plans for entrance roadway, parking facilities and seating arrangements</li> <li>- Development plans</li> </ul>	2 years

Shower facilities	<ul style="list-style-type: none"> <li>- Site plans</li> <li>- Development plans</li> </ul>	3 years
Internal circulation (winter facilities roadway)	<ul style="list-style-type: none"> <li>- Site plans for alternate route</li> <li>- Development plan</li> <li>- Rehabilitation of existing roadway</li> </ul>	2 years
Visitor services centre	<ul style="list-style-type: none"> <li>- Visitor services plan for park</li> <li>- Archaeological survey (site specific)</li> <li>- Site plans and architectural plans for centre</li> <li>- Site plans completed in conjunction with same for traffic circle</li> <li>- Development plans</li> <li>- Construction plans</li> </ul>	3 years
Internal circulation (traffic circle)	<ul style="list-style-type: none"> <li>- Traffic counts and visitor flow pattern analysis</li> <li>- Site plans to be completed in conjunction with same for visitor services plan</li> <li>- Development plans</li> </ul>	2 years
Internal circulation (Riverside Campground entrance)	<ul style="list-style-type: none"> <li>- Traffic flow analysis</li> <li>- Site plans for redesign requirements</li> <li>- Development plans</li> </ul>	1 to 2 years
Day-use facilities	<ul style="list-style-type: none"> <li>- Intensive site evaluation of dune formation to determine most appropriate means of accommodating pedestrian traffic from the parking lots to the beach</li> <li>- Site plans for the development of picnic nodes, concession building site, change houses and pedestrian structures, if appropriate.</li> <li>- Development plans</li> <li>- Monitoring program of dune system responsive to implementation of various phases of development</li> <li>- Removal of beach roads</li> </ul>	4 years
Internal circulation (concession corner)	<ul style="list-style-type: none"> <li>- Traffic counts and flow pattern analysis</li> <li>- Site plans</li> <li>- Development plans</li> </ul>	3 years

Administration office complex	<ul style="list-style-type: none"><li>- Evaluation of present traffic flow</li><li>- Relocation of O.P.P. detachment office</li><li>- Architectural and site plans</li><li>- Development plans</li></ul>	2 years
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## Park Services

## Park Operations

Pinery Provincial Park operates on a year-round basis offering facilities and services to all park visitors. Camping and day-use are heaviest during the summer and winter seasons. However, educational groups are frequent visitors to the park in the spring and fall months.

The yearly park operations are directly related to the seasonal peaks in visitation, maintenance programs and development operations. Six operational phases have been identified:

### April 1 to May 10

During this period, park operations are minimal. Riverside Campground (Area 1) is open to campers; however, the day-use area and other campgrounds remain closed after the winter operations. Major annual maintenance projects are undertaken, the fire protection program is initiated with staff training, and emergency plans are reviewed.

### May 11 to June 21

This period represents the beginning of summer operations. Approximately 75 percent of all seasonal staff are hired and trained for camp offices, maintenance, security and other duties. Day-use facilities and campgrounds are opened along with the park concession facility and the necessary services are provided. Campsites, beaches, picnic areas and facilities are cleaned. A campsite appraisal program takes place during this period. As a result, some sites are closed until the following year to avoid site deterioration. The number of sites available to the public during this period is proportional to the complement of full and part-time staff. The Ontario Provincial Police detachment is enlarged to a 12-man force and becomes increasingly involved with the park security program.

### June 22 to September 5

This period covers the busy summer season. Programs are fully operative, and the remaining staff are hired and trained. The visitor services program provides a range of services to both visitors and park management.

Daily maintenance and operational duties make up a large part of the park functions during this period. Some capital projects are ongoing, depending on type and scale.

September 6 to October 31

Following the summer season, many of the park's operational functions are reduced. Burley campground, the camp offices, the concession and the day-use area are closed. Some internal roads are closed to vehicular traffic in preparation for the winter program. Park staff is cut to a minimum of part-time and permanent staff. Many maintenance programs are fully operational.

The outdoor education component of the visitor services program is emphasized during this period. The fire protection program ends on October 31st.

November 1 to December 15

During this period, the park is staffed by permanent employees only. Operations include the maintenance and improvement of winter facilities. Because of its 130 electrical sites, Riverside Campground remains open for camping.

December 16 to March 31

Park staff is increased during this period for the winter activities programs. All winter facilities are maintained. The park operates on a 24-hour basis with a full security program.

Approximately 9.6 km of internal roads are cleared during this period. A portion of the uncleared roadways are signed and maintained as snowmobile trails.

The visitor services program takes on a winter orientation. Pamphlets and brochures describing available facilities are produced and distributed.

Staffing

Permanent Staff Requirements

<u>Position</u>	<u>Number of Persons</u>
Superintendent	1
Assistant Superintendent (Maintenance)	1
Assistant Superintendent (Operations)	1
Visitor Services Programmer	1
Accounts and Clerical	2
Others	9

### Seasonal Staff Requirements in Each Operational Phase

<u>Operational Phase</u>	<u>Number of Persons</u>
April 1 to May 10	20
May 11 to June 25	20 initially with additional staff hired to a maximum of 120.
June 26 to September 5	120
September 6 to October 31	120 initially with reductions to 20
November 1 to December 15	20 to 4
December 16 to March 31	4 to 12

### Service Facilities

#### Water

Water is supplied by Bosanquet Township from the Ministry of the Environment pumping station at Grand Bend. An internal water system, installed in 1974-75, distributes water to major park facilities. Water quality testing is carried out by the Ministry of Health every second week.

#### Communications

Telephone service is provided by the Huron-Ontario Telephone Company, Thedford, Ontario. The four trunk lines into the park and all internal lines are maintained by the company.

Radio communications are provided through a network of radio links consisting of seven base stations at camp offices and entrance control points, 13 mobile units and three hand-held portables. The Ontario Provincial Police vehicles are equipped with mobile units for communication with park staff.

#### Electrical

Electrical power is supplied by Ontario Hydro Power Commission through a three-phase system.

#### Fire Protection

A 25-m steel observation tower is strategically located and manned during high hazard periods of the fire season. Equipment includes four fire pumps, back pumps, hoses, etc. The park evacuation plan is reviewed with park staff, and a fire-fighting training course is held annually.

### Emergency Services

The Ontario Provincial Police detachment office, located in the park, is operational year-round.

Ambulance services are available from Thedford (16.1 km), Dashwood (19.3 km), Parkhill (16.1 km), Forest (30.6 km) and Exeter (38.6 km).

Hospital services are available in London (88.5 km) and Sarnia (80.5 km).

### Toilet Facilities

There are 20 comfort stations located in the park. All have running water and flush toilets. In addition, there are 64 vault toilets.

### Garbage

Garbage is picked up daily from each campground and from other areas in the park as required. All garbage is transported to the Superior Sanitation Landfill site at Watford.

## Management Policy

### River

The river level will continue to be maintained at a high level above the concession bridge. This section of the river will be stocked each spring with trout to provide increased opportunities for fishing.

A river survey will be undertaken to gain a better understanding of the river system. Conclusions will be translated into refined management practices.

### Off-road Vehicles

All-terrain vehicles and motorcycles are banned from the park. Snowmobiles will be permitted to use the designated trails which, for the most part, are unplowed roadways. A 15-cm snow base must be present on all sections of the trails before snowmobile traffic can be permitted. A strict enforcement program will continue to operate to ensure that all regulations are upheld.

### Campgrounds

Campsites will continue to be evaluated each year, and sites will be closed for rehabilitation if over-use is causing deterioration.

The pre-registration system will be maintained, and campsites will be designated for specific types of equipment.

The one car per campsite regulation will be strictly enforced. A parking lot for visitors and second vehicles will be available in each campground. The capacity of these parking lots will be limited.

Campsite boundaries will be clearly marked, and buffer zones will be maintained.

Dead trees, which are a safety hazard, will be removed from campsite areas.

Fire grills will be permanently installed on some campsites to discourage indiscriminant fire building.

No additional campsites will be developed. A maximum operating level of 1,000 sites will be maintained when feasible. Sites damaged by severe flooding and adjacent to sensitive features will be removed.

## Landforms

The rehabilitation and stabilization program introduced in recent years will continue in areas subject to heavy use, on road cuts and in areas adjacent to valued structures. The program will focus only on areas where visitors and development have disturbed the landforms.

An extensive evaluation of dune protection and rehabilitation techniques will be undertaken. All methods of transporting pedestrian traffic from campgrounds and parking lots to beach areas will be investigated. The sites will be carefully studied to determine possible effects of the re-location of facilities.

No protective measures will be implemented along the primary dune structures which are subject to erosion from high lake levels and storm waves.

## Vegetation

No commercial timber removal will be permitted. Only trees which present a safety hazard will be cut down. Non-native trees planted in the nature reserve zone may be removed. Only native species will be used in future re-vegetation programs. Non-native grasses may be grown in heavily-used areas adjacent to park facilities and on road cuts. The mowing of grassed areas will be strictly regulated by the existing mowing plan. In heavily used areas, a variety of techniques, such as resting, rehabilitation and redesign, will be implemented to aid in re-vegetation.

The use of fire as a management technique is to be investigated further.

## Fire Protection

The present system of fire protection will continue. The will include a manned fire tower during the fire season, staff training, regular maintenance of fire equipment and fire roads and staff reviews of the park evacuation plan.

No camp fires will be allowed in the park when a fire warning has been posted.

## Wildlife

A comprehensive survey of wildlife populations must be undertaken to refine management guidelines.

Hunting, which would conflict with other uses of the park, will not be permitted.

The commercial harvesting of wildlife will be prohibited. Non-native species will not be introduced in the park.



Controls of beaver populations will be permitted if beavers cause flooding problems outside the park.

Feral cats and dogs will be removed or destroyed to prevent disturbance to park wildlife.

#### Archaeological Sites

Consultation will take place between the Ministry of Natural Resources and the Ministry of Culture and Recreation prior to the development of facilities along the river or in areas which may have archaeological value.

Threatened sites will be salvaged and artifacts discovered in the park will be catalogued. The final disposal of artifacts and their use in interpretive displays are governed by The Ontario Heritage Act, 1974.

#### Underground Services

A phased program for burying all electrical cables in the park, with the exception of the main cable, should be undertaken. New service lines should follow the alignment of existing roads to minimize further disruption to the park environment.

## Management and Research Plans

A growing awareness of resource values and sensitivities, increasing pressures for recreational opportunities and support facilities, as well as added complexities in provincial park operational and management fields, have focussed attention on the need for specific detailed plans to cover a variety of individual park functions. These plans, drawn up within the policy framework and guidelines set forth in the park master plan, provide greater depth and added direction to specific areas of concern. Like all planning documents, they will require periodic review and evaluation.

### Park Management and Operating Plan

Compilation of the park management and operating plan will provide full and detailed information on operational and management functions of the park. The content will include information on personnel, safety, financial management, park maintenance, facility operations, law enforcement and security. The plan will contribute to efficient and effective internal administration and will provide quality services to the public.

In addition to the topics itemized above, the plan will contain a section which will detail the visitor services program for the park, based upon the visitor services statement contained in this master plan.

The directives for a trails plan will be contained within the park management and operating plan. Trail facilities at Pinery have been expanded in the past two years through the development of a 22-km cross-country ski trail. Other trails include a 22.5-km snowmobile trail and 16 km of hiking trails for summer visitors.

Trail facilities should provide safe and stimulating recreation for the park visitor, with minimal conflict and impact on the surrounding landscape adjacent to the trail corridor. The growing popularity in the various types of trail facilities underlines the need for an orderly approach to the development and management of existing and future trails in the park.

The trails plan for Pinery will cover the entire system of trails and trail-oriented facilities to be provided at the park. The plan will be guided by the policies and guidelines of the park master plan and the visitor services program.

A major component within the park management and operating plan will be the definition of detailed directives concerning resource management, particularly with reference to objectives and practises for management of the dunes, park vegetation, the Ausable River and wildlife populations within the park.

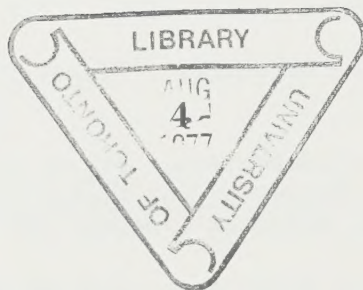
### Future Studies and Research Plan

The future studies and research plan will be a comprehensive document concerning research needs in the earth science, life science and archaeological/historical fields. The fundamental purpose of the plan is to identify and encourage a systematic approach to the investigation of biophysical, historical and archaeological features in the park. Specific projects to be undertaken in the future will be identified and priorities set, based on planning and management needs.

The document will also outline the park's policy for controlling and monitoring all future research projects within Pinery Provincial Park.

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June, 1977

